NEW PSYCHOLOGY

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PREFACE.

THAT the most effective teaching is impossible without an acquaintance with the elementary principles of Psychology, is no longer a debated question. Fortunately there are many who are "born teachers." Even *they* are more successful when to a "certain instinct for teaching" they have added a knowledge of Psychology. Still more helpful to a genuine success is a knowledge of the Mind to the plodding rank and file, that large body of earnest men and women teachers whose really splendid equipment for their profession is to be credited to unremitting hard work inspired by an honest ambition to win success, and a sturdy determination to avail themselves of every approved resource.

This book has been written principally for the special benefit of that large number of progressive young teachers who have not enjoyed the benefits of a college education, but who nevertheless are striving without the aid of an instructor to make their work rational and therefore more efficient by basing it on a knowledge of the Mind. The division of the subject matter into "Lessons," while admirably adapting the book to the special requirements of teachers' reading circles, was particularly intended by the author to supply the need of a practicable *text-book* for

classes in Psychology. Having embodied in these pages the experience of many years in teaching Psychology not only to teachers but also to pupils in the schools, the author believes that he has provided a *class*book that the teacher may place with confidence in the hands of his pupils, and the superintendent or Normal School instructor in the hands of his training classes. It is hoped that the "Questions" following each Lesson will enhance its helpfulness both to the teacher and the student.

The author ventures to hope that the emphasis laid upon the limitations of Physiological Psychology and upon education as a preparation for rational living; above all, that his constant effort to keep the essential difficulties of the subject in such full view as to prevent the student from mistaking his easy mastery of this elementary book for a real mastery of the science of which the book treats — are essential features which will be commended.

The object of the author throughout has been to call the attention of his readers to important mental facts in such a way as to set them to observing their own minds and the minds of their pupils, in order to see for themselves the usefulness of the facts and the experience so gained, their application to the daily work of teaching, and their inestimable value as an added factor toward success. Profoundly convinced as he is of the importance of a knowledge of Psychology to the teacher, he is quite as strongly convinced that the only really fruitful knowledge of Psychology which the teacher will ever gain, he will derive from a study of his own mind and the minds of the people with whom he comes in contact, and that books about Psychology are useful chiefly as they give suggestions in this direction. In other words, the aim of the

author has been to act the part of a guide in a strange city — to tell his readers where to look to find valuable truths. If he succeeds in stimulating them to become diligent students of their own minds and the minds of their pupils, he will be more than satisfied.

The author wishes to make acknowledgment to his colleagues, Dr. Bleile and Mr. Wissler, for suggestions relating to the chapters on Physiological Psychology.

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LESSON I.

THE BENEFITS OF PSYCHOLOGY TO THE TEACHER.

We all believe that it is worth while to study a great many things of which we do not expect to make any practical use. You believe, for example, that it is a good thing to study algebra and geometry, not because you think the knowledge of them is likely to be useful to you — unless you should be called upon to teach them — but because you think the study of them will develop your mind.

Reasons for Studying Psychology. — Probably that is one of the reasons why you wish to study Psychology. And it certainly is a good reason for studying it. Few subjects are better calculated to develop the power of *thinking* than Psychology. You know that the way to develop any power of the mind is to use it, and it is quite impossible to make any headway in studying Psychology without thinking. That is the reason why it is so hard.

Develops Power of Thought. — When any one makes an assertion about your mind — and that is what human

Psychology consists of, assertions about your mind and the minds of all human beings — it is often, indeed generally, impossible to realize what it means without thinking. Thus, suppose I say that a mental fact is known directly to but one person, and that one the person experiencing it In order to realize what that means, you have to look into your own mind for an example of a mental fact. You recall the oft-repeated assertion, no one knows what any one thinks but himself, and you realize that a thought is a mental fact known to but one person directly, and that one the person experiencing it. But in order to know what other facts are mental facts, you must think long and carefully, until you have made up your mind just what facts are known to but one person directly, and that one the person experiencing them.

Even when you can understand an assertion that any one makes about your mind without looking into your own mind, it is generally necessary for you to do so before you can decide intelligently whether or not it is true. If any one says that you can not get the continuous attention of your pupils without asking questions, or without giving them some other motive for attending besides interest, that statement can be understood without special effort. But in order to determine whether or not it is true, you must *look into your own mind.* You must ask yourself whether any one can keep your attention for a half or three-quarters of an hour simply by being interesting. If you set about answering it in the right way, you will think until you recall some speaker who never asked you questions, or did anything except try to interest you to keep your attention, but who was interesting; then I am sure you will remember that when he was speaking your mind

wandered much more than it would have done if you had known that, when he had finished, he would question you about what he was saying. You will remember that you often allowed your mind to dwell on interesting points that he raised, to the exclusion of what he said directly after.

For these two reasons — (1) because you can not understand most of the assertions in Psychology without thinking; and (2) because, even when you understand them, you can not tell without thinking whether or not they are true — I know of no subject better calculated to make a pupil think, and therefore better fitted to develop the power of thinking, than Psychology.

Practical Reasons. — But apart from this, you wish to study Psychology for quite practical reasons. As a man who intends to be a surveyor studies trigonometry, not merely because it will develop his mind, but because of the use it will be to him, so you study Psychology because you think the knowledge of it will make you a better teacher.

Nature of Teaching. — How will it help you in this direction? Before you can answer this question, you must answer another. What is teaching? People used to intimate what they thought of this by saying that a teacher "keeps school." But "keeping school" is not teaching. Nor is it to teach to hear recitations. *To teach is to deal with mind — is to get it to* DO *something which it would not have done apart from the teacher, in order to get it to* BECOME *something which it would not have become apart from him.*

In order to do this intelligently, you plainly need to

have as clear an idea as possible of what you wish your pupils to become. If your pupils were everything that you wish them to become, you would not undertake to teach them. What is it that you wish them to become? In what respect do you wish them to change as the result of your teaching? That question, the study of Psychology will help you to answer; and the more you know about Psychology, the more clearly and fully and definitely you can answer it.

Meaning of Development. — Quite likely you think you can answer it now. You say you wish your pupils to have better developed minds at the end of each day than they had at the beginning. But better developed in what direction? The North American Indians had remarkable powers of observation. They could track an enemy through a forest where you could see no trace of a human being. Will you be content to have your pupils acquire powers similar to those possessed by the North American Indians? Is this what you wish them to become? The Chinese have remarkable memories. Many educated Chinamen remember almost word for word the nine classics compiled and edited by Confucius. Do you want your pupils to have minds like the Chinese?

I do not, of course, mean to imply that you should not aim to cultivate the observing powers of your pupils as well as their memories. But the North American Indians developed their powers of observation at the expense of the higher powers of their minds, and the Chinese their mechanical memory in the same costly way. And yet the Chinese aim at development. It is evident, therefore, that when one says that the object of education

is development, he has not expressed a very definite idea. The question is, What kind of development? and that question Psychology will help us answer.

Necessity of a Definite Aim. — So you see that when you say you want to help your pupils develop their minds, you have by no means proved that you know precisely what, as an intelligent teacher, you ought to aim at. And unless we know what to aim at, we can not hope to have success. Do you think an architect could build a beautiful house if he began to build it and worked at it from day to day without having in his mind, so to speak, the house he was trying to build? Well, if a carpenter must have a picture in his mind of the kind of house he wishes to build in order to build it, how can we hope to succeed in moulding and forming the minds of our pupils in an intelligent way, unless we have the clearest ideas of what we wish them to become?

Need of a Criterion of Knowledge. — But at any rate, perhaps you think you are clear as to one thing in which you wish your pupils to change; you wish them to become less ignorant — you wish them to know more. But to know more of what? We have not got very far when we say that we wish to help our pupils to acquire knowledge, unless we have made up our minds as to what knowledge is worth acquiring. There is a good deal of history in the text-books which is not worth learning, and a good deal out of them which is in the highest degree important, and the same is true of the other subjects we teach. How are we to make up our minds what knowledge is worth acquiring? The study of Psychology will help us do that. It

will help us see the effect which the acquiring of this or that piece of knowledge will have on the mind, and in this way enable us to estimate its worth.

Here again it is evident that it is quite impossible to succeed in teaching unless in some way we are able to decide intelligently what we ought to get our pupils to learn. Until we are able to decide that, we can, in the first place, aim only to get them to learn everything in the text-book. This is bad for two reasons: in the first place, text-books are sometimes written by men who know so little of the subject that they can not tell what is important and what is not important; and in the second place, intelligent men put many things in text-books, not that students may learn them, but that they may be able to refer to them if they have occasion to use them. No one but a fool would commit to memory a railroad guide. And yet railroad guides are very useful; but when any one has occasion for them, he goes to them. He remembers what he finds there just as long as he wants it, and then does not trouble his head with it any longer. Now, intelligent men put many such facts in the books they write — facts which they do not expect any one to learn, but to which they think persons may sometimes have occasion to refer. For these two reasons, it is very unfortunate for a teacher to have to rely entirely upon his text-books in deciding what to teach.

The study of Psychology, then, will help us see what we ought to aim at. It will help us see the kind of development we ought to try to help them get, and the kind of knowledge we ought to try to impart.

QUESTIONS ON THE TEXT.

1. What are the two reasons for studying Psychology?

2. How is any power of the mind developed?

3. What are the two reasons which make the study of Psychology so useful in developing the power to think?

4. What is teaching?

5. Give two illustrations to show that when you say you wish your pupils to have better developed minds, your statement lacks clearness.

6. Show that you can not succeed as a teacher unless you know what to aim at.

7. Show that when you say you wish to make your pupils less ignorant, your statement lacks clearness.

8. How will the study of Psychology help you in this direction?

9. Why should not a teacher limit himself to teaching what is in the text-books?

10. What is the central thought which this lesson aims to bring out?

SUGGESTIVE QUESTIONS.

1. Which do you regard as the more important service rendered by the study of Psychology to the teacher — increasing his power to think, or expanding his knowledge of the conditions under which the mind acts?

2. One writer speaks of a certain kind of memory as the "index" memory, and another of another kind as the "mechanical" memory. Can you get from this lesson any idea of what they are?

3. Do you believe that it is possible to train the powers of observation in general, *i.e.*, to train them in such a way that their possessor will be a good observer of any kind of facts?

LESSON II.

THE BENEFITS OF PSYCHOLOGY TO THE TEACHER.

(Continued.)

Conditions of Success.—To succeed well in any difficult undertaking, three things are necessary: (1) one must see clearly the thing to be done; (2) he must have a clear idea of the best means of doing it; and (3) he must have a strong motive for doing it well. He in whom these conditions meet most perfectly — who sees most clearly the thing to be done, who has the clearest perception of the best means of doing it, who has the strongest motive for making strenuous efforts to do it — is the person most likely to succeed in any difficult undertaking.

The study of Psychology can not be urged on the ground that it is likely to do much toward making the teacher interested in his work, and more willing, therefore, to work hard in order to do it well. It is not, indeed, without effect in this direction. The work of teachers who make no study of mind is likely to be mechanical, while the work of teachers who base their efforts on a knowledge of mind is rational. And mechanical work is uninteresting, unattractive — fit only for machines. Anything, therefore, which tends to make a teacher's work rational certainly tends to make it interesting. This was what Fitch meant when he called teaching the noblest of arts and the sorriest of trades. Practiced mechanically,

it is indeed a trade, and a sorry one at that; practiced rationally — practiced by one who realizes that he is dealing with mind, and who uses this method or that, not because some one else has used it, but because his knowledge of mind leads him to believe that a given method is the best — teaching is the noblest of arts.

Psychology and Teaching. — But while the study of Psychology is of some benefit to the teacher in that it tends to give him more interest in his work, I do not urge it on this ground. It is for the other two reasons, (1) because of the clearness which it is fitted to give to the aim of the intelligent teacher, and (2) because of the light it throws on the best methods of realizing that aim, that I believe no teacher who is ambitious to succeed should neglect to study those phases of Psychology that bear on education.

In the last lesson I tried to show what the study of Psychology can do for us in the first direction. I tried to show that when we are able to say that our aim is to bring about the development of our pupils, we have not got very far unless we have made up our minds as to the value, so to speak, of the various faculties of the mind — that unless we know the worth of the observing powers, and of the various kinds of memory, imagination, and reasoning, we can not proceed intelligently in training them. In like manner, unless we have made up our minds as to "what knowledge is of most worth," I tried to show that it is of little use to be able to say that we wish to induce our pupils to acquire knowledge. I tried further to show that Psychology, by helping us discover the relation of the various powers of the mind to each other, will help us determine the kind of development we ought to aim at;

and also, that by helping us see the effect of the various kinds of knowledge upon the mind, it will help us decide "what knowledge is of most worth."

But not only will the study of Psychology tend to give clearness and definiteness to our aim, it will tend quite as strongly to show what we must do to realize that aim.

Methods Used in Dealing with Objects in the Material World.—In dealing with mind we must use the same kinds of methods which we use when we deal with objects in the material world. What we accomplish in the material world we accomplish by putting objects where they will be subject to new influences, so that the forces of nature may do the work we wish to have done. Mortar in one place and bricks in another do nothing to make the walls of a house, but place the bricks on a strong foundation, and put the mortar between them, and you have a strong wall. All you have done, you will note, is to *move* the bricks and mortar so as to put them in new positions and make them subject to new influences, so that the forces of nature may do the desired work. Heat water to the boiling-point, and it will change into steam; and if you leave it where it can escape, nothing will come of it. But move the water into a confined place, so that the steam can not escape, and then you can make it drive immense palaces across the sea, or pull huge trains across the continent. Every invention which has ever been made is simply a way of moving things into new positions where they are subject to new influences, so that the forces of nature may do the desired work. *All the force that is employed in nature exists in nature. All that man accomplishes he accomplishes by making the forces of*

nature work under different circumstances, and by turning them into different channels from those in which they would have worked apart from him. It is by making nature our servant that we have made such wonderful progress in material civilization in the nineteenth century. How is it that we have been able to make nature work for us in such wonderful ways? Simply by knowing the laws of nature. Knowing the laws of nature, we have been able, so to speak, to foresee what she would do under certain circumstances, and the result is the steam-engine, the telegraph, the telephone, the phonograph, and all the other inventions which minister to our well-being.

Methods to be Used in Dealing with the Mind.—In dealing with mind we must work in the same way. As everything which happens in nature is due to the laws of nature, so everything which happens in mind is due to the laws of mind. As our power in nature depends upon the skill with which we get her to work for us, so our power in dealing with mind depends upon our ability to get it so to act that the results we desire will follow. As success in dealing with nature consists in supplying the conditions which make it possible for nature to do the desired work, so success in dealing with the mind consists in supplying the conditions which make it possible for the mind to do the work we want it to do. And as the better we know the laws of nature (in other words, the better we know the conditions under which nature will produce this or that result) the better we can supply those conditions; so the better we know the laws of the mind (in other words, the better we know the conditions under which the mind will do this or that, the better we can supply these conditions. The

aim of the teacher being a certain kind of development, and the communication of a certain kind of knowledge, evidently the more he knows of the conditions under which the mind develops, and the conditions under which it acquires knowledge, the better he can supply them.

Difference in this Respect between Natural Agent and the Mind. — "But is there no difference," you may ask, "between a natural agent and the human mind in this regard? May we say of the human mind, as we may of a natural agent, that it will always do all the work it can under the given condition?" There is an important difference, but it makes for rather than against the skillful teacher. A natural agent can not be flattered, bribed, or cajoled; it takes no account of intentions or motives. In dealing with a natural agent, the one single, simple, all determining question is, Are the conditions fulfilled? If they are fulfilled, the effect will follow; if they are not fulfilled, the effect will not follow. But the case is different with the human mind. When we have put the mind under the right influences, it has a *natural tendency* to the kind of activity we wish to occasion; but this tendency may be increased or diminished by purely personal relations. A teacher who adapts the subject of instruction to the mental condition of his pupil creates a *tendency* in the mind of his pupil to follow his instruction with interest. But if by impatience, ill-humor, or sarcastic remarks the teacher has excited the antagonism of the pupil, the pupil *resists* the tendency; he is unwilling to do what he knows his teacher desires. If, on the other hand, the teacher by patience and industry and kindness has gained the regard of his pupil, the pupil *exerts* himself to attend to the sub-

ject. In this way it happens that personal qualities may atone, to some extent, for lack of skill on the part of the teacher.

Do you ask if a corresponding increase in the teacher's knowledge of mind, and a corresponding increase in his skill in basing his work on that knowledge would enable him to work such miracles in the minds of his pupils as inventors have worked in nature through their knowledge of the laws of nature? I can not, of course, answer such a question. No one can. But in the School of the Far-off Future — when no teacher will be allowed to enter a school-room who has not made a thorough study of educational Psychology, and who has not proved to the entire satisfaction of competent judges his ability to apply what he has learned — in that school there will be no dull, listless, inattentive pupils. There will be no boys who leave school because they do not like it. There will be no pupils who hate books.

Why Pupils do not Learn. — As a child learns not only rapidly but with intense pleasure from the time of his birth to the time he starts to school *simply because the activities in which he spontaneously engages are fitted to his state of development*, so he will continue to learn rapidly and with intense pleasure *after* he starts to school *if the work he is set to doing is adapted to his state of development.*

Answer of Comenius. — Do you know who Comenius was? It was he who said that if our pupils do not learn it is our fault. And he was undoubtedly right. If we supplied the proper conditions, our pupils would as certainly learn

as a train will move when the engineer turns on the steam.

Answer of Pestalozzi. — Do you know who Pestalozzi was? It was he who said that if pupils are inattentive the teacher should first look to himself for the reason. He also was undoubtedly right. As certainly as a blade of corn will grow and mature if it is treated right — if the proper conditions are supplied — so certainly will our pupils attend, and think as the result of attending, and develop as the result of thinking, if we supply the proper conditions.

Can Conditions of Learning Always be Supplied? — "If we supply the proper conditions." It is but truth to say that that sometimes is beyond our power under the circumstances in which we are obliged to work. Some pupils have so little capacity for a subject that to supply the proper conditions would require an amount of attention which the teacher can not possibly give them. It is doubtful also if there are not cases in which there is so little capacity for a subject as to make it a waste of time for the pupil to attempt to study it. A case came under my own observation of a boy who would spend *five hours* on a spelling lesson, and still miss nine words out of ten. I am strongly inclined to the opinion that spelling was an accomplishment which he could not afford to acquire. (*See* Appendix A.)

QUESTIONS ON THE TEXT.

1. What three things are essential to success in a difficult undertaking?

2. What can the study of Psychology do to make a teacher interested in his work?

3. What did Fitch say about teaching, and what did he mean by it?

4. How will the study of Psychology help a teacher to see at what he should aim?

5. How do men accomplish anything in nature?

6. Illustrate your statement.

7. Show that the same thing is true in our dealings with mind.

8. Do you believe that teachers could accomplish as wonderful results in dealing with the minds of their pupils as inventors have accomplished in dealing with nature, if they knew as much about mind?

9. Why do so many pupils dislike the work of school?

10. What did Comenius say is the reason our pupils do not learn?

11. Is there anything in our system of classification which increases the difficulty of adapting our work to individual pupils so as to make it pleasant to them?

12. What can be done to obviate this?

SUGGESTIVE QUESTIONS.

1. Who is Fitch?
2. What book on education has he written?
3. Who was Comenius? When did he live?
4. Who was Pestalozzi, and when was he born?
5. What reform did he work in education?

LESSON III.

BODY AND MIND.

Connection between Body and Mind. — We all know that there is an intimate connection between body and mind. We know that when our eyes are open we see, and when they are closed, we do not see; that when our hands, or other parts of the body, are in contact with an object we have a sensation of touch, and when they are not, we do not. We know that when we deprive our bodies of proper nourishment, as in fasting, we have a headache, and the longer we fast, the more incapable we become of any kind of mental exertion. We know that any derangement of the bodily functions produces an immediate effect upon the mind. We know that tea and coffee stimulate, and that alcoholic liquors intoxicate. Many a student has brought upon himself a feeling of bodily exhaustion through purely mental labor; or, by a long tramp or some other form of prolonged physical exertion, he has produced a feeling of mental exhaustion. In other words, prolonged mental labor not only fatigues the mind but the body; prolonged physical labor not only fatigues the body but the mind. Those are a few of the familiar facts which have made it impossible for any one to doubt that there is a very close relation between the body and the mind.

Opinion of the Greeks as to the Connection of the Brain and the Mind. — But it is by no means so evident that the brain is the part of the body which is in some sort of direct relation with the mind, and that the rest of the body influences the mind only through its relation to the brain. We shall realize this if we remember that though the Greek physician Alcmæon regarded the brain as the common meeting-place of the senses, and this opinion was accepted by Plato, yet Aristotle, himself the son of a doctor, and one of the greatest of the Greek philosophers, rejected it. He said that the brain was a lump of cold substance, useful as the source of the fluid which lubricates the eyes, but quite unfit to be the organ of mind. What is the evidence which has led physiologists to conclude that he was mistaken?

Effect on Consciousness of a Blow on the Head. — It is a matter of direct experience that the connection between consciousness and the brain is closer than that between consciousness and any other part of the body. A blow on the head may deprive us of consciousness; a blow on any other part of the body, as a rule, only inflicts pain. It is indeed true that a blow on the heart may cause unconsciousness. But that is because the blow may prevent the heart from sending to the brain its proper supply of blood.

The Nerves Compared with Telegraph Wires. — Moreover, the pain that we feel from a blow on any other part of the body depends upon the brain. Cut the nerve that connects one of the fingers with the brain, and an injury inflicted upon it makes no impression on consciousness.

The relation between the body and the brain may be roughly compared to the relation between a telegraph wire and the receiving office. The telegraph wire is important because it is the medium through which the messages are transmitted to the receiving office. But it is the machinery at the receiving office which makes the receipt of messages possible. And precisely as no message can be received if the telegraph wire is cut or injured, so no effect is produced upon the brain, and therefore none on consciousness, if the nerves connecting an injured part of the body with the brain are injured.

There is a rough resemblance between the relation of consciousness to the brain, and that of the ringing of a bell to the striking of its sides by its clapper. Cause the bell by any means to swing to and fro so that the clapper strikes its sides, and you cause it to ring. Affect the brain in any way, either by a blow on the head, or by increasing or decreasing the quantity of blood that supplies it, or by changing its quality, and you affect consciousness. Pulling the bell-rope only causes the bell to ring because it causes the clapper to strike the sides of the bell. When we see how closely pain follows upon an injury inflicted on any part of the body, we might suppose that the bodily injury is the direct cause of the consciousness of pain. But when we remember that the bodily injury affects consciousness only as the effect of the injury is communicated to the brain, we see that it is the effect upon the brain that influences consciousness.

The Supply of Blood to the Brain. — This conclusion, which facts familiar to all of us render highly probable, may be regarded as demonstrated by the conclusions of

science. While the weight of the entire brain is only about one forty-second of the weight of the body, it has been calculated that the supply of blood used by the brain is one eighth of that used by the whole body. How essential this supply of blood is, becomes evident if it is in any way interfered with. Stop one of the great arteries leading to the brain by compression in the neck or in any other way, and great disturbances in consciousness at once appear, even to the point of its entire cessation. One investigator, Dr. Lombard, found that the temperature of the head varies rapidly, though slightly, during waking hours. By careful measurements with delicate thermoelectric apparatus he found that "every cause that attracts the attention — a noise, or the sight of some person or other object — produces elevation of temperature. An elevation of temperature also occurs under the influence of an emotion, or during an interesting reading aloud."[1]

Mosso's Table. — If it were possible to doubt that this rise in temperature is due to an increase in the blood supplied to the brain, that possibility would seem to be removed by the experiments of an Italian investigator named Mosso. He devised a table so accurately balanced that a man might recline on it without disturbing its balance. He found that its balance was at once destroyed by any cause that quickened the activity of the subject's consciousness. A sudden noise, an interesting thought, anything that increased the activity of consciousness, would cause the head end of the table to sink down as quickly as if a weight had been placed upon it.

[1] Quoted by Ladd, *Physiological Psychology*, p. 242.

Localization of Cerebral Functions. — All the arguments in support of what is called the localization of cerebral functions are so many arguments to show that the brain is the organ of the mind. These arguments we will consider in a later chapter. Suffice it here to say that it has been proved to the satisfaction of physiologists and psychologists, not only that the brain is the organ of mind, but that particular parts of the brain are connected in a peculiarly close and intimate way with certain mental activities. Evidently every argument in support of this conclusion is equally good to show that the brain is the organ of the mind.

A large number of experiments made upon the lower animals prove the same fact. First one part and then another of the brain of various lower animals (frogs and pigeons, for example) has been removed for the purpose of ascertaining what part of the brain is connected with particular classes of mental operations. And though the phenomena vary with the animal, and with the part of the brain removed, to say nothing of the skill of the operator, the facts taken together leave no doubt of the special connection between the brain and the mind.

The American Crow-bar Case. — For obvious reasons such experiments have not been performed upon the brains of men, but disease and accident have performed them for us. One of the most famous of these experiments is that which is now known as the American crow-bar case. While a young man named Gage was "tamping a blasting charge in a rock with a pointed iron bar, 3 feet 7 inches in length, $1\frac{1}{4}$ inches in diameter, and weighing $13\frac{1}{4}$ lbs., the charge suddenly exploded. The iron bar, propelled with its pointed end first, entered at the left angle of the

patient's jaw, and passed clean through the top of his head, near the sagittal suture in the frontal region, and was picked up at some distance covered with blood and brains. The patient was for a moment stunned, but, within an hour after the accident, he was able to walk up a long flight of stairs and give the surgeon an intelligible account of the injury he had sustained. His life naturally was for a long time despaired of; but he ultimately recovered, and lived twelve and a half years afterwards. . . . The whole track of the bar is included in that region of the brain which I have described as the præfrontal region. . . . Hear what Dr. Harlow (in a paper read in 1868 before the Massachusetts Medical Society) says as to his mental condition: 'His contractors, who regarded him as the most efficient and capable foreman in their employ previous to his injury, considered the change in his mind so marked that they could not give him his place again. The equilibrium or balance, so to speak, between his intellectual faculties and animal propensities seems to have been destroyed. He is fitful, irreverent, indulging at times in the grossest profanity (which was not previously his custom), manifesting but little deference to his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet capricious and vacillating, devising many plans of future operation, which are no sooner arranged than they are abandoned in turn for others more feasible. A child in his intellectual capacity and manifestations, he has the animal passions of a strong man. Previously to his injury, though untrained in the schools, he possessed a well-balanced mind, and was looked upon by the people who knew him as a shrewd, smart business man, very energetic and persistent in executing all his

plans of operation. In this regard, his mind was radically changed, so decidedly, that his friends and acquaintances said he was no longer Gage.'"[1]

Impairment of Memory Due to Injury of the Brain.— It is a matter of common knowledge that injuries to the brain often result in an impairment of memory. Forbes Winslow notes a remarkable case of a soldier upon whom the operation of trephining had been performed and who lost a portion of his brain. The result was that he forgot the numbers *five* and *seven*, and those only. After a time his memory of these numbers was restored. Numerous cases are on record of the impairment of memory in consequence of a violent blow on the head.

Aphasia.—Very significant as to the dependence of mind on brain are the phenomena designated by the general term *aphasia*. Dr. Bateman says the term is used "to designate that condition in which the intelligence is unaffected, or at all events but slightly impaired; when thoughts are conceived by the patient but he can not express himself, either because he has lost the memory of words, or because he has lost the memory of the mechanical process necessary for the pronunciation of these words; or because the rupture of the means of communication between the gray matter of the brain and the organs, whose co-operation is necessary to produce speech, does not allow the will to act upon them in a normal manner as the ideas are formed, but the means of communication with the external world do not exist."[2]

[1] Quoted by Calderwood in *The Relations of Mind and Brain*, pp. 479-481, from Ferrier's *Localization of Cerebral Disease*.

[2] Quoted by Calderwood, p. 388.

Motor Aphasia. — The foregoing definition, as we shall see in a later chapter, covers phenomena widely different from each other. A man who can understand what is said to him, but who can not talk, is said to suffer from *motor* aphasia. He knows what he wants to say, but he has lost control of the mechanism of speech. Sufferers from another kind of aphasia have perfect control ot the mechanism of speech. They can talk, but they can not under stand what is said to them. They can hear, but they can not grasp the meaning of what is said to them.

Now in cases of motor aphasia it has been proved that the cause of the difficulty is located in a definitely ascertained part of the brain. Says Professor James: "Whenever a patient dies in such a condition as this and an examination of his brain is permitted, it is found that the lowest frontal gyrus is the seat of injury."

Correspondence between Size and Weight of Brain, and Intelligence. — Still another class of facts may be pointed out as indicating the closeness of the relation between the mind and the brain. Comparative anatomy shows that there is a general, though indefinite, correspondence of the place of an animal in the scale of intelligence, to the size and weight of its brain compared with the bulk of its entire body. In other words, *as a rule*, the larger and heavier the brain of an animal in comparison with the weight of its entire body, the higher it is in the scale of intelligence. As Professor Ladd says, "The law itself is confessedly subject to remarkable and unexplained exceptions; at best it only holds good in a general way. For example, the relative weight of the brain is not greatly different in the dolphin, in the baboon, and in

man." Nevertheless, it may fairly be regarded as adding to the evidence which has convinced physiologists and psychologists that the brain is the organ of the mind.

QUESTIONS ON THE TEXT.

1. Mention some of the facts that prove the dependence of the mind upon the body.
2. Show how essential to consciousness is a plentiful supply of blood to the brain.
3. What is meant by aphasia?
4. State the details of the American crow-bar case.
5. What is the relation between the size and weight of the brain of an animal, and its position in the scale of intelligence?

SUGGESTIVE QUESTIONS.

1. What is meant by the localization of functions?
2. Have any cases of impairment of memory from injury to the brain come under your observation?

LESSON IV.

THE CENTRAL NERVOUS SYSTEM.

In the preceding chapter we have considered the evidence which seems to prove that the brain is the organ of the mind. Let us in this chapter endeavor to get an idea of that wonderful mechanism of which the brain constitutes the most conspicuous part. Let us try to get an idea of the central nervous system.

We learned in the last lesson that there is a direct connection between the outside of the body and the brain. If your hand comes in contact with a hot stove, you quickly become aware of it through sensations of touch and of pain. There is an equally direct connection between the brain and the muscles that move the hand. As soon as you become conscious of the sensation of pain you snatch your hand away.

Nerves and Tendons. — If you dissect the body of one of the higher animals, you will see some of the machinery by means of which such phenomena are brought about. You will see numerous white cords which look like tendons — those dense white cords in which a muscle terminates, and which attach the muscles to the bones of the body. But that these white cords are not muscles, is shown by the fact that many of them are not connected with muscles

at all, and those which are, usually enter the central part of the muscle, instead of being attached to its end as tendons usually are. These cords are nerves.

If you follow them in one direction, they subdivide into smaller and smaller branches until they become too small to be seen without the aid of the microscope. If you follow them in the opposite direction, they become larger and larger through uniting with similar nerves until they enter a much larger mass, whose structure and appearance differ widely from that of the nerves which enter it. This mass is called a nerve centre.

Nerve Fibres and Nerve Cells. — Nerves are composed of one or more nervous elements called *nerve fibres*, bound together by connective tissue. The chief constituent of a nerve centre is nerve cells. Nerve fibres and nerve cells differ in density, shape and chemical composition. Fibrous nerve matter contains more water than cellular nerve matter, and is therefore less dense than the latter. They differ in their shape. Fibres are long "thread-like connections," while nerve cells have a great variety of forms. "Some are nearly round; others ovoidal, caudate, stellate, or shaped like a flask or the blade of a paddle." Nerve fibres and nerve cells differ in size. Nerve fibres vary from about $\frac{1}{1500}$ to $\frac{1}{14000}$ of an inch in diameter, while nerve cells vary from about $\frac{1}{250}$ to $\frac{1}{3500}$ of an inch. It is supposed that there are not less than two and a half millions of sensory nerve fibres alone, while man's entire central nervous system is reckoned to have about three thousand million nerve cells.

Nerve fibres are never found apart from nerve cells. Indeed, recent investigation has shown that the fibre is an

outgrowth or prolongation of the cell.[1] A nerve cell with its prolongation into a nerve fibre constitutes the unit of the nervous system. The essential element of a nerve fibre is called its axis-cylinder. Near the ending of a nerve fibre it is the only constituent of the fibre that is

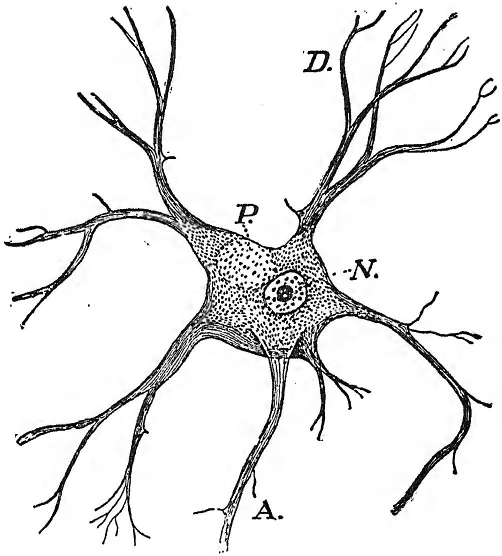


FIG. 1.—Isolated body of a large cell from the ventral horn of the spinal cord. Human, $\times$ 200 diameters. *A*, fibre or fibrous element; *D*, dendrons; *N*, nucleus with enclosures; *P*, pigment spot. (Modified from Donaldson.)

left; the other elements—the transparent envelope, called the primitive sheath, and the fatty substance, called the medullary sheath, which the primitive sheath encloses and which usually encloses the axis-cylinder—being wanting.

[1] The term *neuron* is applied to the cell with all of its prolongations, of which the fibre is only one. The other prolongations of a cell are called dendrons.

Two Functions of the Nervous System. — We may regard the nervous system as a mechanism having two great functions to perform: (1) reporting the condition of the outside world to the individual, and enabling him to control his actions accordingly; and (2) binding the various parts of the body into an interdependent whole.

The first function we are too familiar with to make extended illustration necessary. A person suffering from rheumatism, feeling a draught of cold air, gets up and

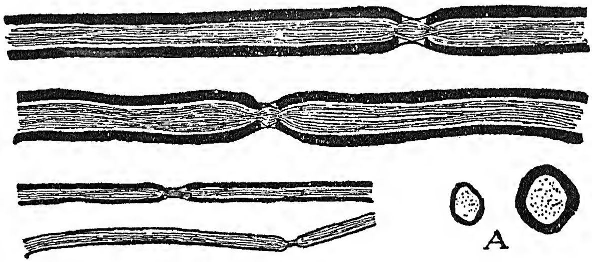


FIG. 2. — Longitudinal and transverse (*A*) sections of nerve fibres. The heavy border represents the medullary sheath, which becomes thicker in the larger fibres. Sciatic nerve. Human, × 400 diameters. (Donaldson.)

closes the window. His nerves report the condition of the outside world; his nerves set in motion the machinery — the proper muscles — by means of which he closes the window. The one action may be compared with the telephoning to the fire department of a city that a building in a certain part of it is on fire; the other to the sending of engines to extinguish the fire.

The same illustration may be used to illustrate the second function of the nervous system, the binding together of the various parts of the body into one inter-

dependent whole. When a draught of cold air strikes the body, apart from the voluntary motion which it may occasion, its effects may be felt throughout the entire body. The heart and lungs may modify their activity; some of the involuntary muscles may contract; and a shudder may run through the entire physical organism.[1]

Martin well says that in common life "the very frequency of this uniting activity of the nervous system is such that we are apt to entirely overlook it. We do not wonder how the sight of pleasant food will make the mouth water and the hand reach out for it; it seems, as we say, 'natural,' and to need no explanation. But the eye itself can excite no desire, cause the secretion of no saliva, and the movement of no limb. The whole complex result depends on the fact that the eye is united by the optic nerve with the brain, and that again by other nerves with saliva-forming cells, and with muscular fibres of the arm; and through these a change excited by light falling into the eye is enabled to produce changes in far-removed organs, and excite desire, sensation, and movement."[2]

Functions of Fibres and Cells. — This general survey of the functions of the nervous system enables us to anticipate in an indefinite way the work to be done by the two elements of the nervous system. The fibres, or nerves composed of fibres, will have as their function to transmit stimulations from the surface or outer part of the body to the nerve centres, and to transmit impulses from those centres to the muscles. The cells, or centres composed of cells, will have as their function to receive the stimula-

[1] Cf. Ladd, *Physiological Psychology*, p. 19.

[2] Martin's *Physiology*, p. 208.

tions transmitted by the nerves, and to send impulses along the nerves to the muscles.

Afferent and Efferent Nerves. — The nerves, accordingly, may be divided into two classes: the first class connect some sensitive structure as the skin, the retina, the nervous membrane of the stomach, at their peripheral termination, with the centre; the second connect the centre with the muscles to which they are attached at their peripheral termination.

The first class are excited to activity by some structure at their peripheral termination, and transmit nervous action to the centre. They are, therefore, called afferent, in-carrying, or centripetal nerves. The second class are excited to activity by the nerve centres with which they are connected, and transmit nervous excitation to the muscles with which they are connected at their peripheral extremity. They are, therefore, called efferent, out-carrying, centrifugal, or motor nerves.

The most important of the afferent nerves for Psychology are those which are called sensory nerves, because they connect the sense organs — eyes, ears and so on — with the nerve centres. The most important of the motor nerves for Psychology are those which connect the nerve centres with the "voluntary" muscles — those of the hands, arms, legs, eyes, for example.

Nature of the Sense Organs. — The greater part of the sense organs consist largely of mechanical contrivances whose function is to modify the external stimulus, and convey the impulse imparted by it to the nerves of sense.

For example, the nose consists in large part of a mechanism for bringing the particles of odorous substances in contact with that part of the mucous membrane of the nose in which the olfactory nerve terminates. In order that an object may be smelled, it is not enough that an odorous substance be held near the nose. A current of air containing particles of the odorous substance must be drawn through the nose, and thus brought into contact with the terminal fibres of the olfactory nerve.

In like manner the ear consists for the most part of a mechanism whose function is to modify the waves of sound, and transmit them so modified to the internal ear, in which the fibres of the auditory nerve terminate. When the vibrations of air reach the tympanum, they have too large an amplitude, and too little intensity, to occasion these vibrations in the elements of the internal ear, which are essential to the excitation of the auditory nerve. The tympanum modifies these vibrations so as to adapt them to the excitation of the terminal fibres of the auditory nerve, and at the same time transmits them to the internal ear.

So likewise, the eye consists in part of an optical instrument, in part of a sensitive nervous membrane called the retina, on which the image resulting from the optical instrument is formed. The eye, as an optical instrument, transmits the stimulations received from light to the nervous elements in the retina in which the optic nerve terminates.

The nerve centres with which Psychology is especially interested are those which are found in the encephalon, or contents of the skull, and the spinal cord.

Gray and White Matter. — These centres consist of masses of gray and white matter. The white matter consists chiefly of nerve fibres; the gray matter, of nerve cells. These cells, as we have seen, have prolongations or outgrowths called fibres, of which the axis-cylinder is the most essential element. After the axis-cylinder leaves the cell, it divides into two or more parts. Some of these parts enter the white mass, composed chiefly of nerve fibres, and become part of these fibres. Some pass through this white mass and unite with the parts into which the axis-cylinders, extending from other cells, are divided.

Gray Matter of the Brain. — The gray matter of the brain is not found in a single compact mass. The cerebrum, located in the upper and front part of the brain, has a covering of gray matter, "like a thin rind," called the cerebral cortex, from $\frac{1}{12}$ to $\frac{1}{8}$ of an inch in thickness. Within the cerebrum, and separated from the gray matter of the cortex by a mass of white matter, are found the large ganglia — masses of gray matter — which are called the optic thalami. Behind these are the corpora quadrigemina, and behind these, and forming a part of the outside surface of the brain, is the cerebellum. These, with the gray masses of the spinal cord, and the medulla oblongata, the body in which the spinal cord terminates, are the gray masses of the nervous system in which Psychology is especially interested.

Spinal Cord. — The spinal cord and the brain are continuous. There is no point where we can say that the one stops and the other begins. Physiologists have, however, agreed to regard the cord as commencing opposite the

outer margin of the *foramen magnum* of the occipital bone. Its average diameter is about $\frac{3}{4}$ of an inch; its length, 17 inches; and its weight, $1\frac{1}{2}$ ounces.

It is nearly divided into right and left halves by two fissures, one on the ventral, and the other directly opposite,

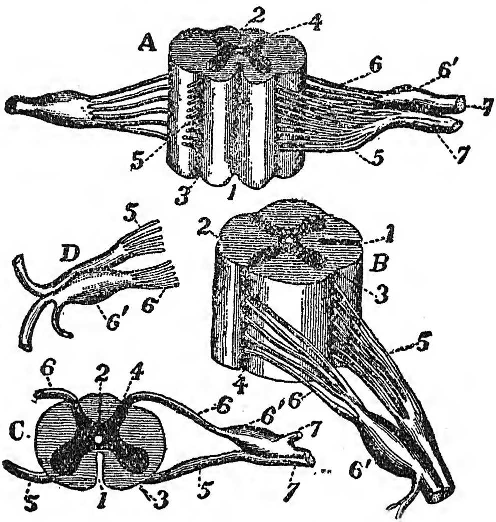


FIG. 3.—The spinal cord and nerve-roots. *A*, a small portion of the cord seen from the ventral side; *B*, the same seen laterally; *C*, a cross-section of the cord; *D*, the two roots of a spinal nerve; 1, anterior (ventral) fissure; 2, posterior (dorsal) fissure; 3, surface groove along the line of attachment of the anterior nerve-roots; 4, line of origin of the posterior roots; 5, anterior root filaments of spinal nerve; 6, posterior root filaments; 6′, ganglion of the posterior root; 7, 7′, the first two divisions of the nerve-trunk after the union of the two roots. (Martin.)

on the dorsal side. If we examine a transverse section of the cord, we shall find that it is composed of white and gray matter, and that its white matter surrounds its gray matter, which is arranged "somewhat in the form of a capital H," the horizontal bar representing the gray matter which connects the gray matter in the right and

left halves of the cord, and the two vertical bars representing the gray matter on the right and left of the fissure.

The white matter consists of fibres, some traversing it in a horizontal and others in a vertical direction, and a connecting substance called *neuroglia*. The gray matter consists of ganglion cells and a homogeneous gray mass in

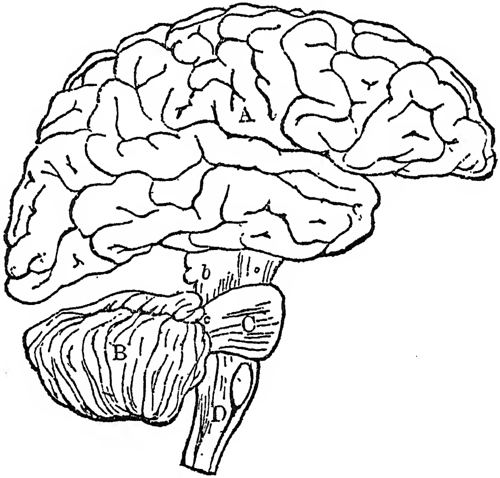


FIG. 4.— Diagram illustrating the general relationships of the parts of the brain. *A*, fore-brain; *b*, mid-brain; *B*, cerebellum; *C*, pons Varolii; *D*, medulla oblongata; *B*, *C*, and *D* together constitute the hind-brain. (Martin.)

which a majority of recent observers find a net-work of fine axis-cylinders running in all directions.

Thirty-one pairs of nerves enter the spinal cord. Each of these nerves, before entering the cord, divides into a dorsal and ventral part which are called respectively the posterior and the anterior roots of the nerve. The posterior root consists of afferent or sensory fibres, the anterior root of efferent or motor fibres.

The brain is much larger than the spinal cord, and much more complex in its structure. The whole brain in the adult male weighs on the average about 50 ounces. Figure 4 illustrates in a general way the position of the various parts of the brain. The fore-brain weighs in man on the average about 44 ounces. It consists chiefly of the cerebrum, which is divided into two parts known as the cerebral hemispheres by a deep fissure which extends through its middle.

Folds of the Cortex. — The gray cortical rind which constitutes the surface of the cerebrum is folded upon itself many times as appears from Figure 5. These folds are called *gyri* or *convolutions*. Their effect is to greatly increase the surface of the brain. It is estimated that if the cortex of the brain of a person of average intelligence were unfolded it would be found to have an area of about four square feet. The folds of the human cortex are deeper and more numerous, as a rule, than those of the most intelligent animals, and in the brains of the most highly civilized nations than in those of savages.

For reasons which will be stated in a later chapter, the cortex of the cerebrum is the part of the brain which is supposed to be connected in the closest and most intimate way with intelligence. It is, therefore, important for students of Psychology to pay special attention to it.

If we examine the convolutions of different brains, we shall see that they vary greatly in their details, not only in different individuals, but even in the two hemispheres of the same brain. The convolutions have been divided into primary, secondary and tertiary classes according to the strength and clearness and positiveness with which they

are distinguishable. The primary convolutions have been compared to the large mountain ranges whose height and breadth and direction give to an extensive territory its characteristic features; the secondary convolutions to those subordinate ranges which owe their existence to valleys in the mountain range, running in the same direction; the tertiary convolutions to the small spurs that extend into

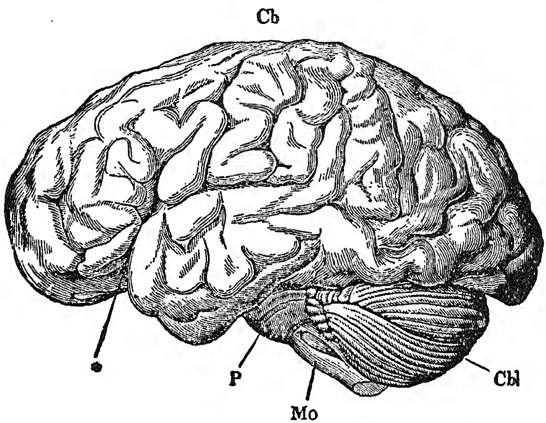


FIG. 5.—The brain from the left side. *Cb*, the cerebral hemispheres forming the main bulk of the fore-brain; *Cbl*, the cerebellum; *Mo*, the medulla oblongata *P*, the pons Varolii; * the fissure of Sylvius. (Martin.)

the valleys from the side of the ranges. The primary convolutions are distributed in the brains of different individuals and in the two lobes of the same cerebrum with a good deal of regularity. With them, all regularity stops. The depressions between the convolutions are called sulci. Corresponding to primary, secondary and tertiary convolutions are, accordingly, primary, secondary and tertiary sulci.

Cortex a System of Organs. — The cortex is a very complex organ—perhaps we ought to say, system of organs. For it is made up of a vast multitude of nervous elements with immovable fibres connecting them with each other and with other parts of the nervous system. We shall the more clearly realize the reasons for regarding — at least in a provisional way — the cortex as a system of organs, if we bear in mind what these connecting fibres are. They may be divided into four classes.

Sensory Fibres and the Cortex. — The first class is composed of sensory fibres. They may be described in brief as the fibres which form the last connecting link between the surface of the body where the sensory impulse starts, and the centre. I say the last connecting link. For the nervous impulse "changes cars," so to speak, a number of times on its way from the surface of the body to the cortex. The first change is made when the sensory impulse reaches the cells in the posterior horns of the spinal cord. Sometimes — as in the case of reflex action, hereafter to be described — the sensory impulse travels no farther. But generally it travels upward along fibres which run throughout the entire length of the spinal cord to the medulla oblongata, where these terminal fibres bend at right angles and pass into its gray matter. The sensory impulse is interrupted here — "changes cars" — but passes out of the medulla oblongata through a number of other gray masses, until it finally reaches the cortex. These fibres then, the fibres which form the last connecting link between the various parts of the surface and the centre, are the first of the four classes which terminate in the cortex.

Motor Fibres and the Cortex. — The second class of connecting fibres in the cortex are those that form the first connecting link between the cortex and the voluntary muscles. These motor fibres, as we may term them, are the paths by which motor impulses travel from the cortex. The entire path from the cortex to the muscle has been divided into two parts — the central motor path and the peripheral motor path. The central motor path — in the case of the spinal motor nerve — consists of (1) the fibres extending from the cells in the cortex, and (2) the fibres extending upwards from the motor cells of the anterior horns of the spinal cord.

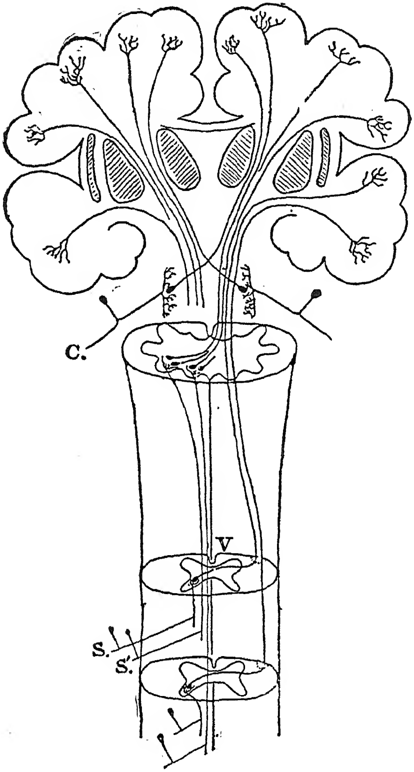


FIG 6. — Schema showing the pathway of the sensory impulses. On the left side, *S*, *S'*, represent afferent spinal nerve fibres; *C*, an afferent cranial nerve fibre. This fibre in each case terminates near a central cell, the fibre of which crosses the middle line, and ends in the opposite hemisphere. (Modified from Donaldson.)

The peripheral motor path consists of the fibres connecting the same motor cell with the muscle. The motor fibres

of the cortex constitute the first part of the central motor path.

Association Fibres. — The third class of connecting fibres are called *association* fibres. They connect one part of the cortex with another. Says Edinger: "They extend everywhere from convolution to convolution, connecting parts which lie near each other as well as those which are widely separated." They are called association fibres because it is supposed to be by means of them that we are able to associate one experience with another.

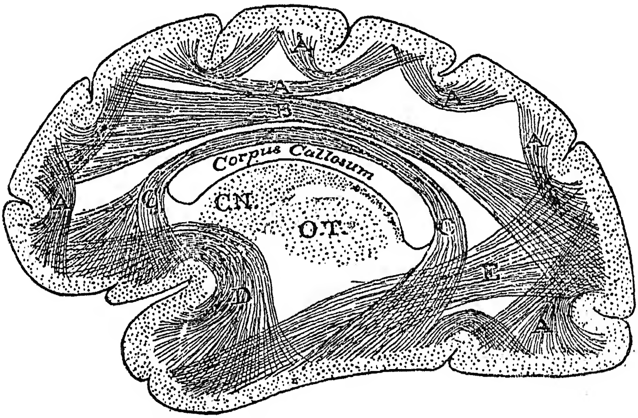


FIG. 7 — Lateral view of a human hemisphere, showing the bundles of association fibres. (Starr.) *A*, *A*, between adjacent gyri; *B*, between frontal and occipital areas; *C*, between frontal and temporal areas, cingulum; *D*, between frontal and temporal areas, fasciculus uncinatus; *E*, between occipital and temporal areas fasciculus longitudinalis inferior; *C.N.*, caudate nucleus; *O.T.*, optic thalamus. (Donaldson.)

Commissural Fibres. — The fourth class of connecting fibres are those which connect identical parts of the two hemispheres of the cerebrum with each other. They are called commissural.

QUESTIONS ON THE TEXT.

1. What is the difference between nerve cells and nerve fibres?

2. What is a neuron?

3. What are the two functions of the nervous system?

4. What are afferent nerves?

5. Mention the parts of the brain in which Psychology is especially interested.

6. Describe the four classes of fibres which connect one part of the cortex with another, and with the various parts of the body.

LESSON V.

THE FUNCTIONS OF THE NERVOUS SYSTEM.

Functions of the Fibres. — After this brief survey of the nervous system we are ready to consider its functions. It is evident that the office of the fibres is to conduct nervous excitations. When you snatch your hand away from a hot stove, the pain is not in the hand; for, if the nerve which connects the hand with the spinal cord is divided, you will feel no pain. The burn has caused a change in the ends of the nerve that terminate in the injured part, and this change has been transmitted along the nerve to the spinal cord. The same kind of evidence shows that the motor nerves running from the spinal cord to the muscles have the same office. For, if the nerves extending to the muscles of your arm be divided, you can not snatch your hand away when you feel the sensation of pain. You will be like an animal shot by an arrow which has been dipped in the poison called curari — a poison which renders the motor nerves incapable of action, while it does not affect the sensory nerves. You will feel the pain, but will be unable to move your hand.

Nature of a Nervous Impulse. — As to the nature of the change which takes place during the passage of a nervous impulse, physiologists and psychologists are almost

entirely ignorant. Says Professor Martin: "Since between sense organs and sensory centres, and these latter and the muscles, nervous impulses are the only means of communication, it is through them that we arrive at our opinions concerning the external universe and through them that we are able to act upon it; their ultimate nature is therefore a matter of great interest, but one about which we unfortunately know very little." [1]

Nerve centres also conduct nervous excitations, but this is not their most characteristic work. Perhaps the best way to realize what this is, is to contrast reflex with voluntary actions, as many physiologists understand it.

We all know what is meant by voluntary actions. They are actions which seem to be the result of our volitions. For certain conscious reasons, we will to act in a certain way, and the action follows. If, however, the act takes place as the result of the stimulation of an afferent nerve, without the intervention of consciousness, it is called reflex.

Voluntary, Reflex and Semi-reflex Actions. — Professor James gives a clear illustration of the difference between voluntary and reflex actions and a kind of action intermediate between the two. "If I hear the conductor calling 'All aboard!' as I enter the depot," he says, "my heart first stops, then palpitates, and my legs respond to the air waves falling upon my tympanum by quickening their movements. If I stumble as I run, the sensation of falling provokes the movement of the hands towards the direction of the fall, the effect of which is to shield the body from too sudden a shock. If a cinder enter my eye,

[1] Martin's *Physiology*, p. 203.

its lids close forcibly, and a copious flow of tears tends to wash it out."[1]

In this illustration we have examples of three different kinds of action. The quickening of the pace in consequence of the conductor's "All aboard!" is an example of voluntary action. It is an action following upon a distinct volition, or at least upon a definite state of consciousness. With the closure of the eye, on the other hand, and the flow of tears, consciousness had nothing to do. The nervous impulse caused by the cinder passed along an afferent nerve leading from the eye to a certain nerve centre, and that centre imparted an impulse to an efferent nerve connected with the muscles whose contraction results in the closure of the eye, and the result was the closure of the eye without the intervention of consciousness. Such actions are called reflex.

The movement of the hands illustrates what is sometimes called semi-reflex actions, and sometimes acquired reflexes. The last term is the better because it marks the two essential facts in the case: (1) The action so characterized is now performed without the intervention of consciousness. In that respect it is like reflex actions, so called. (2) Such actions were not originally so performed. They are therefore said to be acquired reflexes.

Mechanical Nature of Reflex Actions. — That the actions described as reflex are mechanical, there can be no manner of doubt. Certain afferent and efferent nerves, with the nerve centres of which they are outgrowths or prolongations, with the muscles with which the efferent nerves are connected, are the mechanical contrivances for

[1] James's *Psychology*, p. 12.

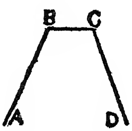
the performance of certain particular kinds of actions. Any correct definition you may make of a machine will apply equally well to the mechanism concerned in reflex action. Pull the trigger of a gun and it fires; put a cinder in the eye and it closes. Strike a certain key of a piano and it produces a certain note. Stroke the flanks of a brainless frog and it croaks.

I will not stop here to enlarge upon the fact that a large number of actions originally voluntary become acquired reflexes — which is only a way of saying that certain nerve centres can be educated to perform, without the aid of consciousness, actions of which they were quite incapable in the beginning. What I wish to emphasize is the fact that many eminent physiologists and not a few psychologists believe that there is no real difference between reflex actions and voluntary actions, except in the degree of complexity of the mechanism by means of which they are brought about.

The Automatic Theory. — Says the physiologist Foster: "The real difference between an automatic (reflex) action and a voluntary act is that the chain of physiological events between the act and its physiological cause is in the one case short and simple, in the other long and complex." In other words — according to this doctrine — as a segment of the spinal cord, with its afferent and efferent nerves, may be regarded as a comparatively simple machine, the cerebrum, with the nerves and the nerve centres connected with it, is likewise a machine, only very much more complex and intricate in its structure. As you can not help closing your eye when a cinder gets into it, your spinal cord being what it is, so you can not help read-

ing this chapter, providing you *are* reading it, your cerebrum being what it is. As consciousness certainly has nothing to do with reflex actions — so the doctrine asserts — it has nothing to do with so-called voluntary actions. If you could find a machine whose actions made no noise, it would illustrate the reflex machinery of our bodies in that such a machine acts without consciousness. The ordinary, more or less noisy machinery with which we are acquainted illustrates the nervous mechanism by which so-called voluntary actions are performed. For, as the noise of the machine contributes nothing whatever to what the machine does, as it is the inert effect of its activity, so (according to the doctrine) consciousness — our feelings, hopes, fears, volitions — has nothing whatever to do with our actions. We get up, eat, walk, write, read, study, go on journeys, adapt a long series of actions to what seems an intelligent purpose, not because we are intelligent, conscious beings, but because our bodies are supplied with a wonderful piece of mechanism — the cerebrum.

Some crude diagrams may help to make the matter clear.



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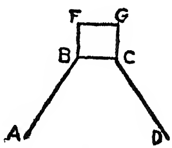

2.

Diagram 1 illustrates the mechanism of reflex action. The line *AB* represents the afferent nerve along which a nervous impulse travels to the nerve centre *BC*, and *CD* the efferent nerve along which the nervous impulse is deflected by the nerve centre. This illustrates in a rough way the

mechanism of reflex action. A nervous impulse starts at one point *A* and is propagated to a nerve centre, where it is deflected and propagated in the opposite direction by a nerve centre. The action from start to finish is purely material. Consciousness has no more to do with it than it has with the falling of a house which is blown down by a tornado.

Diagram 2 illustrates the mechanism of so-called voluntary action — according to the doctrine. The line *AB* represents the path of a nervous impulse to a nerve centre as before. But instead of deflecting the nervous impulse in the opposite direction along the efferent nerve *CD*, the nerve centre transmits the impulse along the nerve *BF* to the cortex — the cortical cells deflect it in the opposite direction and propagate it along the nerve *GC*. Although consciousness accompanies such actions, it has nothing to do with causing them — according to the theory. A material change at *A* was the occasion of the nervous impulse, itself only a material change, which travels to *B*; a material change at *B* was the occasion of a nervous impulse — material change — which travels to the cells of the cortex; a material change in the cells of the cortex caused the nervous impulse — material change — along the nerves *GC* and *CD*. From start to finish the action is material, and material only. And although at a certain point in the path consciousness appears, this consciousness has no more to do with the action that follows than the whiz of a moving wheel has with its motion.

Objections to the Theory. — I have not explained this theory for the purpose of criticising it. A theory that flies so rudely in the face of common sense does not need

criticism in the case of the great majority of students. Most of us, I am confident, will feel sure that it is rather the result of the limitations in the knowledge of the specialists who hold it than the proved outcome of incontestable reasoning. Most of us will feel that these specialists have their faces toward their laboratories, and their backs toward life, with its almost infinite wealth of intricate and complex adaptations of means to ends. If we could forget these adaptations, these manifestations of intelligence in ourselves and others which meet us on every hand, it would doubtless be easy to accept a theory which reduces the actions which our bodies perform to one ultimate type, a theory which banishes consciousness from the scene of causality as an unwelcome intruder and disturber of that perfect unity, the realization of which is the ideal of the scientific mind. But with a vivid appreciation of these manifestations of intelligence we shall not be disturbed by the speculations of these theorists, and the less so in view of the fact that some of the most eminent psychologists in the world — among them Professors Wundt, James and Ladd — in full view of all the evidence that seems to support the theory, have rejected it.

Function of the Nerve Centres. — I have called attention to the theory because it seems to me to put in a clear light what is admitted by all parties to be the function of the nervous centres — what we shall call the co-ordination of nervous impulse, in such a way as to cause the outgoing impulses to produce an apparently purposive result. To exhibit the evidence in detail for this conclusion in such a book as this is impossible, but it may be said that the whole difference between the psychologists like Professors

James, Wundt and Ladd, who reject the theory I have described — called the automaton theory — and those who hold it, is as to the extent to which this work of co-ordination is performed by the nerve centres without the aid of consciousness. The former admit that some of the centres of the nervous system perform this work of co-ordination without the aid of consciousness; they also admit that where consciousness intervenes, these nerve centres are the mechanism it employs. The automatists, on the other hand, maintain that this work of co-ordination is in all cases the unassisted work of the nerve centres.

Mechanism Required in Reflex Actions. — The mechanism required in reflex actions is clear, from what has been said of them. It consists (1) of a sensitive surface exterior or interior, (2) an afferent nerve, (3) a cell or nerve centre connecting the afferent nerve with the sensitive surface (4) of an efferent nerve connecting the nerve centre with (5) a muscle or muscles.[1]

The afferent impulse starts in (1), passes along (2), reaches (3), is there changed into an efferent impulse, which passes along (4), finally reaches (5), where it causes a contraction of a muscle or muscles. The essence of reflex action, then, consists in the change by means of the protoplasm of a nerve cell of an afferent into an efferent impulse.[2]

Efferent Impulses.—An efferent impulse is not simply a deflection of an afferent impulse. A crumb of bread in

[1] For the sake of simplicity, I omit from consideration those reflex actions in which the efferent nerve is not connected with muscles.

[2] Foster's *Physiology*, p. 129.

contact with the glottis may occasion a violent fit of coughing in which not only all the respiratory muscles, but nearly all the muscles of the body, are brought into action. The efferent impulse which stimulated the muscles whose contraction resulted in coughing is not in such a case a mere deflection of the afferent impulse. The afferent impulse was slight and feeble; the efferent impulse was extensive and powerful, and was communicated to a large number of nerves. Evidently, the number and character of efferent impulses in any given case depend primarily not on the afferent impulse, but on the changes which take place in the nerve centres.

Automatic Actions. — In addition to the functions of the nerve centres in reflex action, acquired reflexes and voluntary actions, some of them have functions which seem to be sharply contrasted with these. These are the automatic centres, "which are centres not directly excited by nerve fibres conveying impulses to them, but in other ways." For example, the movements in breathing do not depend upon consciousness. In that respect they are contrasted with voluntary actions. But the nerve centres that propagate the nervous excitation to the muscles concerned in breathing are not themselves excited to activity by afferent fibres leading to them. They are stimulated directly by the blood that flows through them. Actions so resulting are, in this respect, contrasted with reflex actions.

We have then four classes of actions: (1) automatic actions — in which the nerve centres concerned are not stimulated by afferent fibres; (2) reflex actions — in which the centres are stimulated by afferent fibres, and to which

they respond with machine-like directness and regularity; (3) acquired reflexes — in which the centres are also stimulated by afferent fibres, and in which they now respond with machine-like directness and regularity, but in which they did not have that power to begin with; (4) voluntary actions — whose differentiating characteristic is that the centres concerned in their production seem to depend on the will.

Centres of Automatic Action. — The medulla oblongata contains numerous centres of automatic action, among them the movements employed in breathing. If the brain is removed above the medulla, the breathing movements are hardly disturbed at all. But if the medulla is removed or injured, all breathing stops, even though the injury be confined entirely to the medulla, the muscles and nerves concerned in breathing being entirely uninjured.

The Cerebellum. — The cerebellum is the organ for many acquired reflexes. We all know how easy it is to walk, and at the same time concentrate our entire attention on a conversation. All that it seems necessary for the mind or consciousness to have to do with it is to set the machine well going, so to speak, when some part of the nervous mechanism relieves consciousness of all further work in the matter. We have forgotten how we learned to walk, but we all remember how necessary it was to give our entire attention to our movements when we were learning to skate or ride a bicycle. But the experienced skater or cyclist can skate or ride with as little attention to what he is doing as we are obliged to give to walking.

The difference between a man who can skate and one

who can not is that the one can and the other can not control his muscles in such a way as to produce the desired result. And the difference between the man who can only skate by giving his entire attention to it, and the one who can skate and think about something else, is that in the one case the mandate to the necessary muscles proceeds from the cerebrum, the centre directly connected with consciousness; in the other, from a centre not directly connected with consciousness. In other words, in the case of the person learning to skate, walk, ride a wheel, play on a musical instrument, the nervous impulse to the proper muscles proceeds directly from the cortex of the cerebrum. In the case of a person who has learned to walk, or the skillful skater or wheelman, all that the cortex of the cerebrum seems to do is to initiate the action, when the supervision and further direction of it is carried on by a lower centre. That centre seems to be the cerebellum. The reason for this conclusion may be summarized as follows: When the cerebellum is injured, the most marked result seems to be a loss of the power to perform the acquired reflexes used in locomotion.

Summary of Conclusion. — We may then sum up the results of this chapter as follows: The functions of the nervous system may be broadly divided into two classes — those of the fibres or nerves, and those of the cells or centres. The office of the fibres is to conduct excitations to and from the centres. The centres are concerned in four kinds of actions: automatic, reflex, acquired reflexes, and voluntary. The medulla oblongata is one of the centres from which automatic actions proceed. The spinal cord is pre-eminently a centre of reflex actions. It is also

a centre of many acquired reflexes. The cerebellum is the centre for the acquired reflexes used in locomotion. We will consider the functions of the cerebrum in the next lesson.

QUESTIONS ON THE TEXT.

1. What is the function of nerve fibres?

2. What is the nature of the change which takes place during the passage of a nervous impulse?

3. What is the difference between reflex, semi-reflex, automatic, and voluntary actions?

4. Explain the automaton theory.

5. What is the mechanism required in reflex actions?

SUGGESTIVE QUESTIONS.

1. Do you believe in the automaton theory?

2. Physiologists are much more inclined to accept the theory than psychologists; what do you suppose is the reason for it?

3. How do you account for the purposive character of reflex actions?

LESSON VI.

THE FUNCTIONS OF THE CEREBRUM.

Cerebrum and Intelligence. — That the cerebrum is more closely related to intelligence than any other part of the nervous system, is proved by the same evidence that goes to show that the brain is the organ of the mind. Re-read the lesson on that subject and you will have before you the evidence that has convinced physiologists and psychologists that the cerebrum is in a special sense the organ of the mind. The blow on the head that deprives one of consciousness is a blow that affects the cerebrum. The nervous connection that must be maintained in order that pain may be felt, is the connection between the injured part and the cerebrum. The injuries to the brain that result in the impairment of memory or aphasia are injuries of the cerebrum.

Cortex and Intelligence. — But the cerebrum is a large organ. Is there any evidence to show that any particular part or parts of it sustain this especially intimate relation to intelligence? There is nearly a consensus of opinion among physiologists and psychologists to the effect that there is such a part, and that is the thin rind of gray matter called the cortex.

The evidence for this opinion may be stated under two

heads: (1) The higher an animal stands in the scale of intelligence, the deeper and more numerous, as a rule, are the folds or convolutions of the cortex. Remembering that these folds increase the surface of the cortex, we may say that, as a rule, the higher an animal stands in the scale of intelligence, the greater the extent of the surface of its cortex in proportion to its size. There are, indeed, a few exceptions to the rule. A few animals, not high in the scale of intelligence, have deeper and more extended folds than other animals standing above them in that scale. (2) The cerebral functions, so far as they have been located, have been located in the cortex. All the evidence, therefore, for the localization of those functions points to the same conclusion. What, then, is the nature of that evidence?

Meaning of "Localization of Functions."—Before attempting to answer this question, let us try to get a clear idea of what is meant by "localization of mental functions." The question which the theory undertakes to answer may be stated as follows: Have different parts of the cerebrum the same work to do in relation to our mental life? Do they sustain the same relation to the life of sensation, memory, and voluntary motion? Those who say that they have, deny, and those who say that they have not, affirm, the localization of the cerebral functions.

Presumptions in Favor of it.—The most general knowledge of the nervous system would lead one to expect some localization of the functions of the cerebrum. We have seen that there are sensory nerves and motor nerves—nerves that minister to sensation and nerves that min-

ister to motion. A further study of the nerves shows us that this division of labor is carried much farther. Some of the efferent nerves are motor and some are not; some of the motor nerves are voluntary and some involuntary. Moreover, each motor nerve is connected with some particular muscle, not with the muscles in general. And precisely as the motor nerves are each of them connected at their peripheral terminations with certain particular muscles, so they have their origin in different parts of the brain. It is difficult to believe that the nervous impulse that travels along them to the muscles does not have its origin in some definite cell or group of cells. In like manner the sensory nerves that connect the surface of the body with the cortex must connect that surface with a definite part of the cortex, provided they go to the cortex at all. The nerves that proceed from the end of my little finger and connect it with the cortex must terminate in some definite place; they cannot terminate in the brain in general.

The presumption, thus created, that different parts of the cerebrum will be found to have different offices to perform in relation to our mental life, is strengthened by a consideration of the nerve centres. The gray matter of the spinal cord is a succession of centres for the performance of different reflex actions; the medulla oblongata is a group of centres for various automatic actions, each having its own definite place. Whether, then, we consider nerve fibres or the lower centres, a strong presumption in favor of the localization of cerebral functions is created.

The Doctrine Comparatively New. — Nevertheless, the doctrine as a scientific theory is only a little more

than a quarter of a century old. The most eminent authorities in physiology half a century ago decided emphatically against it. One of them declared that he had experimented upon the cortex of different animals, dogs, rabbits, and kids, "had irritated it mechanically, cauterized it with potash, nitric acid, etc., and had passed galvanic currents through it, in different directions, without obtaining any signs whatever of muscular contractions."[1]

The same year another eminent physiologist summed up the results of numerous experiments with the declaration that the various parts of the cerebrum have no special function, but that the lobes of the cerebrum perform their functions with their whole mass.

In 1870 Fritsch and Hitzig began the investigations, which, with those of many other workers in the same field, have caused the opinion of those physiologists to be overthrown. It has been perfectly established that certain parts of the cerebrum, at least, have certain specific functions in our mental life.

In stating the evidence for this conclusion no description will be attempted of the particular parts of the cortex which have been proved to be connected with particular mental activities. Knowledge of this sort can be best imparted by diagrams, and upon these I shall rely for making clear the areas of the cortex concerned in particular mental activities so far as they are known.

The localizations most clearly established are the motor areas, those areas from which the nervous impulse starts which results in the contraction of the voluntary muscles. The evidence which proves that there are such areas is of various kinds.

[1] Ladd's *Physiological Psychology*, p. 253.

Effects of Stimulation.—(1) It has been proved that the stimulation of a definite part of the cortex of dogs, monkeys and other animals produces definite movements, sometimes in the face, sometimes in the hind-legs, sometimes in the fore-legs, sometimes in the tail, according to the part stimulated. A savage, upon accidentally striking a key of a piano, might suppose that there was no real connection between his action and the sound that followed it, that the one followed the other by accident. But if he struck the same key again and again, and if he extended his experiments to the other keys of the piano, he could hardly fail to believe that there was a causal connection between each particular key and the sound that followed it. In like manner, when we learn that the stimulation of a particular part of the cortex, both by electricity and mechanically, is invariably followed by a particular movement; when we learn that this movement does not follow if this connection between the part of the cortex stimulated and the nerve centres at the base of the brain has been cut off, it is impossible not to believe that that part of the cortex is the place from which the motor nerves that lead to the muscles concerned in the movement take their origin.

Effects of Removal of Parts of the Brain of Animals.—(2) While stimulating definite areas of the cortex occasions a definite movement of a definite part of the body, it has been proved that a removal of the cortical area which has been shown by stimulation to be connected with a definite movement, deprives the animal of the power to perform that movement.

Difficulties. — It must indeed be admitted that these experiments do not permit such definite, clear-cut conclusions as those arising from the experiments described in the preceding paragraph. For it has been proved that the loss of the power to perform definite movements which results from a removal of a particular part of the cortex is not permanent. Says Professor James: "Even when the entire motor zone of a dog is removed, there is no permanent paralysis of any sort."

Explanation of these Difficulties. — The explanation of these facts is too intricate and involved to be undertaken in such a book as this. I will only say that the generally accepted explanation is that other centres somehow learn to do the work usually performed by the centres which have been destroyed. If we bear in mind that every cortical centre may be regarded from one point of view as the place where incoming currents, along afferent fibres, become outgoing currents along efferent fibres, and if we remember that innumerable fibres connect every cortical centre with every other, we shall perhaps be able to form some idea of how this is possible. As a train, by the destruction of the city of Chicago with all its tracks and depots, although prevented from going from New York to Denver by its customary route, would nevertheless eventually reach its destination by another route, so nerve currents, at first prevented from reaching their destination — particular muscles — by the destruction of the depots — nerve centres — on their customary route, might eventually reach this destination over new routes or new paths.

But whatever may be the explanation of the fact that

animals whose motor areas have been removed somehow learn to perform the movements which they were unable to perform, the fact can not overthrow the conclusion that definite parts of the cortex are the centres particularly concerned in definite movements.

Observations of Men Suffering from Local Brain Disease. — Observations of men suffering from local brain disease have helped to put this conclusion beyond the reach of doubt. These observations have made it possible to map out with a great deal of definiteness the areas of the brain concerned with particular movements. Not only have the centres for the legs and face been mapped out, but within the areas of these centres smaller ones have been mapped out, areas which are concerned with definite movements of the parts of the body concerned. Thus, the areas concerned with the motion of the eyelids, with the muscles of the angle of the mouth, all have their definite positions in the area for the face. "So definite," says Professor Martin, "are the positions of these areas that in cases of localized paralysis, diagnosed as due to lesions of the cerebral cortex, surgeons now have no hesitation in opening the skull in order if possible to remove the cause of trouble, as a small tumor: they know precisely in what spot they will find it."[1]

Said Dr. W. W. Keen: "When I say that the existence of a tumor about the size of the end of the forefinger can be diagnosticated, and before touching the head it should be said (and I was present when the statement was made) that it was a small tumor, that it did not lie on the surface of the brain but a little underneath it, and that it lay

[1] Martin's *Physiology*, p. 624.

partly under the centre for the face and partly under that for the arm in the left side of the brain, and that the man was operated on and the tumor was found exactly where it was believed to be, with perfect recovery of the patient, —it is something which ten years ago would have been declared the art of a magician rather than the cold precision of science." Evidence such as this may be regarded as conclusive, however difficult we may find it to explain to ourselves all the related facts.

Aphasia. — Observations of persons suffering from aphasia confirm this same conclusion. As mentioned in a preceding lesson, in every case in which a post-mortem examination of the brain of a person suffering from motor aphasia has been permitted, an injury has been found in a certain definite part of the brain. The curious facts in connection with aphasia, for example, that a person has control of his voice but can not talk, or that he can write intelligently but can not talk, or that he can write but can not say what he wishes to say, or that he can write but can not read what he has written, are easily explained by the theory of localization of cerebral functions.

If we suppose the cortical centre for the control of the voice and for talking are different, it is easy to see that the injury of the one is not necessarily the injury of the other, and that, therefore, there is no necessary connection between the loss of the power to talk and the ability to control the voice. In like manner it is easy to see that the centre for writing may not be impaired, even if the association fibres that connect the writing centre with the cells concerned in the production of certain ideas are injured. Also, a person whose centre for talking is injured

will be unable to talk, but that will not prevent him from being able to write, if the writing centre is unimpaired. Nor will the fact that a person can write enable him to read what he has written if the association fibres connecting the centres concerned in seeing with the centres corresponding to the idea of what is read are injured.

Hering on the Functions of the Cerebrum. — Professor E. Hering states his conclusions as to the functions of the cerebrum in the following language: "The different parts of the hemispheres are like a great tool-box with a countless variety of tools. Each single element of the cerebrum is a particular tool. Consciousness may be likened to an artisan whose tools gradually become so numerous, so varied and so specialized that he has for every minutest detail of his work a tool which is especially adapted to perform just this precise kind of work very easily and accurately. If he loses one of his tools he still possesses a thousand other tools to do the same work, though under disadvantages both with reference to adaptability and the time involved. Should he happen to lose the use of these thousand also, he might retain hundreds with which to do the work still, but under greatly increased difficulty. He must needs have lost a very large number of his tools if certain actions become absolutely impossible."

Problem of Physiological Psychology. — The assertion that each single element of the cerebrum is a particular tool specially adapted to perform a certain work in consciousness goes a long way beyond the evidence. The sensations of sight, sound, smell, touch and taste have been localized with varying degrees of probability. But

if the famous postulate of Meynert becomes satisfactorily proved, as seems possible, the most distinctive features of the consciousness of human beings will remain unexplained. Professor James states that postulate in the following language: "The highest centres contain nothing but arrangements for representing impressions and movements, and other arrangements for coupling the activity of these arrangements together." Suppose this proved. Suppose we knew the cortical centre for each sensation and each movement, and each idea of a sensation and each idea of a movement; suppose also we knew the association fibres by means of which one sensation (cortical centre) is connected with another sensation (cortical centre), shall we have then an explanation of all the tools which consciousness uses? We shall, *provided the entire mental life consists of sensations and ideas, and associations of sensations and ideas.* But if this is not all of the mental life, *if it leaves out of account the distinctive feature of mental life, the consciousness of relations, as I maintain that it does, then thinking (which consists in the consciousness of relations) is a part of the mental life which in the nature of the case can not be explained by the cerebrum.* Upon this conception of the matter, the work possible to Physiological Psychology will have been done when Meynert's postulate shall have been satisfactorily proved in all its details. But consciousness, as the relating activity of the mind, as binding sensations into a whole of consciously related parts (concepts), and concepts into a whole of consciously related parts (judgments), and judgments into a whole of consciously related parts (acts of reasoning), — all these distinctive and unique features of the human mind must seek their explanation in a

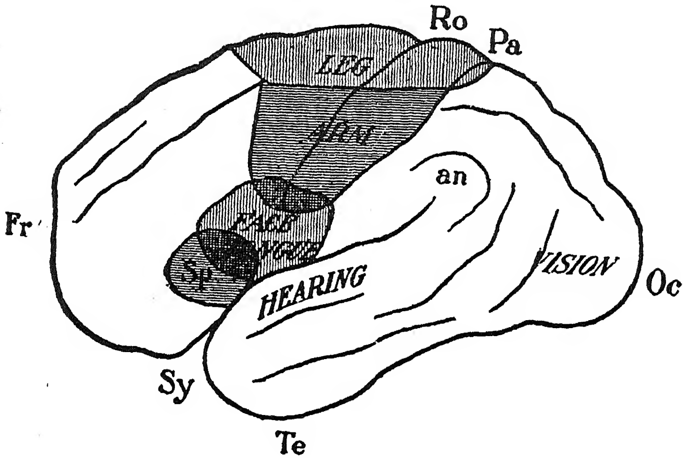

FIG. 8.—Diagram of outer surface of left cerebral hemisphere to illustrate the localization of functions. The motor area is shaded in vertical and transverse lines: *Sy*, fissure of Sylvius; *an*, angular gyrus or convolution; *Ro*, fissure of Rolando; *Fr*, frontal lobe; *Pa*, parietal lobe; *Te*, temporal lobe. Only a very few of the more important fissures are indicated. Compare with Fig. 9. (Martin.)

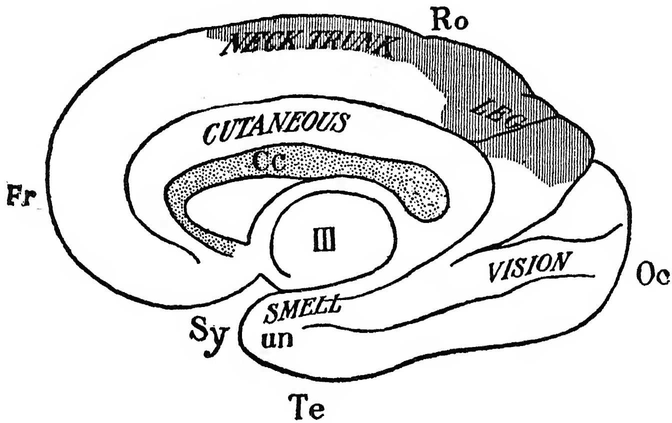

FIG. 9.—Diagram of inner surface of left cerebral hemisphere to illustrate cerebral localization. *Sy*, fissure of Sylvius; *Ro*, fissure of Rolando; *Fr*, frontal lobe; *Oc*, occipital lobe; *Te*, temporal lobe· *Cc*, corpus callosum; *III*, third ventricle. Compare with Fig. 8. (Martin.)

department of thought to which Physiological Psychology is an entire stranger.

The figures on page 63 will show what is known of the parts of the cortex in which the various mental activities have so far been localized.

QUESTIONS ON THE TEXT.

1. Show that the cerebrum is more closely related to intelligence than any other part of the brain.
2. Show that the cortex is more closely related to intelligence than any other part of the cerebrum.
3. What is meant by the "localization of cerebral functions"?
4. State the evidence for it.
5. What is Meynert's postulate?
6. What would follow if it were proved?

SUGGESTIVE QUESTIONS.

1. What is meant by the "relating activity of the mind"?
2. Why can not Physiological Psychology explain it?

LESSON VII.

WHAT IS PSYCHOLOGY?

What is Psychology? — The answer usually given is that Psychology is the science of the mind or soul. But what is the soul? People who have not thought carefully about it would probably say that, whatever it is, it certainly is not the mind. Animals, they would say, plainly have minds, but no one believes that they have souls.

Do Animals Have Souls? — It may serve to give clearness to our ideas to consider the question whether or not animals have souls. Without doubt, *in the confused sense in which the word is used in popular language*, the true answer is that they have. If you suppose that animals have no souls, let me ask you if you have one. You will undoubtedly say that you have. Suppose I ask you whether you are always dreaming when you are asleep. You will probably answer that you are not. And when you say that you are not dreaming, what do you mean?

"I mean," I imagine you saying, "that there are no thoughts or feelings in my mind."

"And when there are no thoughts and feelings in your mind, does your soul continue to exist?"

"I do not understand you."

"You say that you do not think you are always dream-

ing when you are asleep; and when you say that you are not dreaming, you say that you mean that you have no thoughts or feelings in your mind. So far as thoughts and feelings go, I understand you to say that you are exactly like a dead man. A dead man has no thoughts and feelings, neither have you when you are not dreaming. Now, when you have no thoughts and feelings in your mind, does your soul continue to exist?"

"I certainly believe it does, as I have no reason to believe that it ceases to exist when I fall asleep and begins to exist as soon as I awake, as must be the case if it ceases to exist when I have no thoughts and feelings."

"Then you do not mean by soul the thoughts and feelings of which you are conscious, or a part of those thoughts and feelings?"

"Again I do not understand you."

"You say that your soul does not cease to exist when you have no thoughts or feelings; now, if it does not, your soul can not be your thoughts and feelings, can it?"

"Why not?"

"Because if it were, when you have no thoughts and feelings, you would have no soul, would you?"

"I see that I would not."

"And it can not be a part of your thoughts and feelings?"

"No, for if it were any part of them when I had none of any kind, I would have no soul."

"You mean by soul, then, not thoughts and feelings, but the thing that *has* thoughts and feelings?"

"Again I am obliged to say that I do not understand you."

"A German professor is said to have begun a first

lesson on Psychology in this way: 'Students, think about the wall.' After a moment's pause: 'Now think about the thing that thinks about the wall. The thing that thinks about the wall is what is to be the subject of your study.' That is what you mean by soul, is it not — the thing which thinks and feels, the thing which has thoughts and feelings?"

"It is."

"And what do you mean by mind?"

"I mean that which thinks and feels, or that which has thoughts and feelings."

"But things which are identical with the same thing are identical with each other, are they not?"

"They are."

"And if the soul is that which thinks and feels, and the mind is that which thinks and feels, they must be the same, must they not?"

"I see that they must."

"If then you say that dogs, for instance, have minds, can you refuse to admit that they have souls?"

"I am obliged to confess that I can not."

The Soul One of Three Things. — In this imaginary dialogue you may say that in the nature of the case I can prove what I wish to prove, since I can put any words in your mouth I please. But if you will carefully consider it, you will see that you are obliged to say that the soul is one of three things: It is either *all* of our thoughts and feelings, or a part of them, or the thing which *has* thoughts and feelings — the thing which thinks and feels and wills. If you say that the soul is all or a part of our thoughts and feelings — mental facts, in a word — then, instead of

saying that Psychology is the science of the soul, it would be much plainer to say that Psychology is the science of mental facts. But if you say that the soul is that which thinks and feels and wills, then, as we have seen, there is no difference between soul and mind, and we are left with the definition, Psychology is the science of the mind.

Meaning of Mind. — But what do you mean by mind? What we have seen in the case of the soul — that it consists of thoughts, feelings, and acts of the will, or *that which* thinks, feels, and wills — is plainly true of the mind also. It must either be *that which* thinks, feels, and wills, or it must be the thoughts, feelings, and acts of will of which we are conscious — mental facts, in one word. But what do we know about *that which* thinks, feels, and wills, and what can we find out about it? Where is it? You will probably say, in the brain. But if you are speaking literally, if you say that it is in the brain, as a pencil is in the pocket, then you must mean that it takes up room, that it occupies space, and that would make it very much like a material thing. In truth, the more carefully you consider it, the more plainly you will see what thinking men have known for a long time — that we do not know and can not learn anything about the thing which thinks and feels and wills. It is beyond the range of human knowledge. The books which define Psychology as the science of mind have not a word to say about that which thinks and feels and wills. They are entirely taken up with these thoughts and feelings and acts of the will — mental facts, in a word — trying to tell us what they are, and to arrange them in classes, and tell us the circumstances or conditions under which they exist.

It seems to me, therefore, that it would be better to define Psychology as the *science of the experiences, phenomena, or facts of the mind, soul, or self — of mental facts, in a word.*

Definition of Mental Facts. — But what is a mental fact? Let us say, to start with, that it is a fact known directly to but one person, and that the person experiencing it. If you are standing on the street with a half dozen friends, you can all see the houses, and men and women and horses. You can all hear the tramping of feet and the clatter of the vehicles that pass along the street. These facts are open to the observation of all of you alike. But there is a class of facts known directly to but one of you — what you think and feel and will, you know, and no one else does; what A thinks and feels and wills, he knows, and no one else does. These thoughts and feelings and volitions are experiences, phenomena, or facts of the mind, soul, or self — mental facts, in a word — facts known to but one person directly, and that the person experiencing them.

Unconscious Mental Facts. — But I believe there are mental facts not known to any one. If you are intent upon a book, the clock may strike and you may not hear it at the time, and a minute after you may be entirely sure that you heard the clock strike a minute before, although you did not know at the time that you heard it. The true explanation of facts like these seems to be that the clock produced a sensation which you would have known was a sensation of sound if you had attended to it at the time the clock struck, and in the sense of having received a

sensation because of the clock, you heard it. But you did not know that you heard it until the minute after. Now, what must we call this sensation? Plainly a mental fact, although there was a time when it was not known by any one. Still, however, it is marked off quite sharply from all other facts — physical facts we may call them, which may be known with equal directness by any number of people — by the circumstance that, although not known, it is knowable by but one person, and that the person experiencing it. We may then define a mental fact as a fact known or knowable to but one person directly, and that the person experiencing it, and Psychology as the science of mental facts, or the science of the facts of mind.

QUESTIONS ON THE TEXT.

1. How is the question, "What is Psychology," usually answered?
2. Would you say that dogs have souls?
3. How would you defend your answer?
4. What is the objection to defining Psychology as the science of the mind or soul?
5. How would you define Psychology?
6. What is a mental fact?
7. What is a physical fact?
8. Into what two classes would you put mental facts?
9. Can you have mental facts without knowing that you have them?
10. Give examples.

SUGGESTIVE QUESTIONS.

1. Do animals reason?
2. Are you ever in a state of dreamless sleep?
3. What is the difference between matter as a substance, and matter as a group of phenomena?

4. What do we know of matter as a substance—of the experiences, phenomena, or facts of the mind, soul, or self?

5. Why is it that it so often happens that you can not tell your motives for what you do?

6. In what sense is it true that the soul is in the brain?

LESSON VIII.

THE SUBJECT MATTER OF PSYCHOLOGY.

In the last lesson I tried to point out the subject of which Psychology treats. I objected to the usual definition, "Psychology is the science of the mind or soul," not because it is incorrect, but because I do not believe it gives young students definite ideas. I want you to get at the outset the clearest possible notion of the subject you are to study. I want you to realize that the facts of which you are directly conscious, the facts known directly to you only — that these and similar facts form the subject of which Psychology treats.

Physical and Mental Facts. — We may, perhaps, put the subject matter of Psychology in a clearer light by contrasting mental facts with physical facts. A physical fact, as we know, is one open to the observation of all men. Trees, houses, flowers, fences — the whole of external nature, in a word — are physical facts, since all of us can observe them with equal directness. But what shall we say of the brain, or any of the internal organs of one's body? Are they mental facts? They are, *provided* they are known to but one person directly, and that the person experiencing them. But careful reflection will convince you that no one has any direct knowledge of his body.

Have we Direct Knowledge of our Bodies? — That we have such an organ as the heart, for example, was established by a process of reasoning. If we had known it directly, it is hard to see why the world was obliged to wait for Harvey to demonstrate the circulation of the blood — why it was not from the beginning a matter of direct knowledge. Strange as it may seem at first thought, it is pretty nearly absolutely certain that we have no direct knowledge of our own bodies. We learn of the existence of our own bodies as we do of the rest of the external world, by a process of reasoning. Descartes long ago said that if we could move the sun or moon by an effort of will, as we can our hands and feet, we should regard them as a part of our own bodies. The sole difference, so far as Psychology is concerned, between any external object, as a tree, and our bodies, is (1) that the former does not move in obedience to our wills, and (2) that it is not a source of sensations as our bodies are. I put my hand on a hot stove, and I have a feeling of pain. I put a stick in the same position, and I have no such sensation.

How a Child Distinguishes his Body from the Rest of the External World. — Any one who has ever watched a very young child will be quite sure that he has not discriminated his body from the rest of the external world. He first confuses his body with the rest of the external world. Little by little he comes to learn that a little piece of this external world sustains a very peculiar relation to him — that it obeys his will, moves when he wishes it to move, stops when he wishes it to stop, and that it is the direct occasion of pleasure and pain as nothing else is. These two facts, then, and these two facts alone, distin-

guish our bodies from the rest of the external world, so far as Psychology is concerned, and give us our peculiar interest in them.

While this course of reasoning makes it clear that the internal organs of the body are not mental facts, another course will make it equally clear that they *are* physical facts. Is a pencil in a drawer a physical fact? No one can see it. No, you say, but every one can see it if it is taken out of the drawer. Precisely. We need, then, to think of a physical fact as one open to the observation of all men, *certain conditions being complied with.* Bearing this in mind, we see that the various internal organs of the body are physical facts, because when the body is dissected they are open to the observation of all men, precisely as is a tree or flower.

Nature of the Mental Facts of which we are Conscious. —Hoping, then, that the difference between mental and physical facts is so clear that there will be no danger of confusing them, permit me to call your attention a little more closely to the mental facts which we are to study, in order that we may avoid a mistake into which many people fall—the mistake of supposing that any of the mental facts of which we are conscious are simple. You remember our definition of Psychology—the science of the facts, phenomena, or experiences, which, *when we are conscious of them,* we are conscious of as experiences of the mind, soul, or self. The point I wish to emphasize is that we are never conscious of any experience, *separated or detached from* the mind. As you read this, you are, perhaps, conscious of attending. Look into your own mind and see what it is you are conscious of; it is of

yourself attending, is it not?—not of an abstract act of attention. So, also, when you perceive or remember or imagine or reason, what you are conscious of is not an abstract act of perception or memory or imagination or reasoning, but yourself perceiving, yourself remembering, yourself imagining, yourself reasoning. This, of course, is only another way of saying that *you yourself enter as a constituent into every mental fact of which you are conscious*. In other words, in being conscious of mental facts, we are conscious of ourselves. Many writers appear to think that a mental fact of which we are conscious exists independently of the mind and separate from it, as a tree or a stone seems to do. But a careful looking into your own mind will convince you that they are mistaken; it will convince you that when you are conscious of a mental fact you are really conscious of *yourself in a certain act or state, of yourself having a certain experience*. As you never know the act or state or experience apart from yourself, so you never know yourself apart from the act or state or experience. Hume said that when he looked into his own mind he always found thoughts and feelings and acts of the will, but he never found anything else—he never found any self. Certainly not in the sense in which he was speaking. He was looking for a self apart from, and independent of, the various thoughts, feelings, and acts of the will of which he was conscious, and no such self is to be found. The self of consciousness, I repeat, exists—not apart from, but as an element of, the various experiences of which we are conscious.

Of Unconscious Mental Facts.—You will be careful to note that the mental facts into which the mind enters

as a constituent are those of which we are conscious. I have already tried to show that mental facts exist in the lives of each of us of which we are not conscious; mental facts of the existence of which we never know save by a process of reasoning. Of such mental facts the mind is not an element, and that is precisely why we are not conscious of them. The mind is conscious, or has direct knowledge, of only its own acts or states or modifications or experiences. A mental fact which is not an act or state or modification of the mind, the mind can learn the existence of only by a process of reasoning. And now I hope the scope of our definition of Psychology is entirely clear. Psychology is the science of those facts, phenomena, or experiences which, when we are conscious of them, we are conscious of as experiences of the mind, soul, or self.

QUESTIONS ON THE TEXT.

1. What is the usual definition of Psychology, and what is the objection to it?

2. Is the brain a mental fact? Why not?

3. How do we come to distinguish our bodies from the rest of the external world?

4. What is the difference between a mental fact of which we are conscious and one of which we are not conscious?

5. Why is it that we are not conscious of some mental facts?

6. State and explain the definition of Psychology.

SUGGESTIVE QUESTIONS.

1. When was Harvey born, and what did he do?

2. Descartes is called the father of modern philosophy; what does that mean? When was he born?

3. Hume is called a philosophical skeptic; what is a philosophical skeptic?

LESSON IX.

THE METHOD OF PSYCHOLOGY.

Kinds of Mental Facts in which Psychology is Interested.—"But in what kind of mental facts," perhaps you ask, "is Psychology interested? I had the toothache yesterday; that, if I understand you, was a mental fact; but Psychology has no interest in such facts, has it?" No and yes. That you, John Smith, had the toothache is a matter of indifference to Psychology. Psychology has no more interest in that fact than the science of Botany has in the fact that you have a bed of geraniums. Like all sciences, its aim is general knowledge; and that you, John Smith, had the toothache is not general knowledge — it is knowledge of an individual. But when you had the toothache, you found it difficult to study, did you not? You can doubtless recall many similar cases in your experience — cases in which severe pain interfered with that concentration of mind which we call study. And keen delight is just as unfavorable to study. You received a letter some time ago that made you very happy, so happy that you could not concentrate your mind on your work for an hour; and you find that the experience of other people is like yours in this regard. So, although Psychology cares nothing about *your* toothache, there is something

in the experience that it does care about. *So far as your experience illustrates what is true of all minds under similar circumstances, so far it is a matter of interest to Psychology.*

Laws of Mind. — Or I might say that what Psychology especially seeks to ascertain is *laws* of mind, or of mental facts. A law of mental facts is a general truth about mental facts — something which will be true, not only in all your experience, but in the experience of every one under similar circumstances. We have just been considering an example of a law of mental facts — that intense feeling, whether of pleasure or pain, can not exist along with concentration of mind on another subject. That is a law of mental facts, because it is true of the experiences of all men without exception. Since one of the *conditions* of concentration of thought — one of the things which makes it possible — is the absence of intense feeling, concentration of thought, on a subject foreign to the feeling, never can co-exist with intense feeling. That is a perfectly general proposition, and, as such, illustrates a law of the mind.

Evidently, then, to ascertain laws of the mind, you must not only study the facts of your own experience, but those of other people. If you confine yourself to your own experience, you can not be sure that your knowledge is general; you are liable to confuse a personal peculiarity with a principle of human nature. Imagine Andrew Jackson endeavoring to get a knowledge of human nature by studying himself alone. If he had taken himself as a type of men in general, he would have had very erroneous ideas of human nature.

Introspective Method. — But can you study the minds of other people in the same way that you can your own? Try it. You often wish to know whether your pupils are attending to you, or whether they understand you. Can you find out, in the same way, that you know whether or not you are attending? Plainly not. You know that you are attending simply by *looking into* your own mind, and you can not look into the mind of any one else. The word which means looking into is "introspection"; and the adjective "introspective" seems, therefore, to describe best the way or mode or method in which you study your own mind. But you can not learn anything about the minds of other people in that way. When you study other people, you notice their looks and actions. Many teachers think they can tell whether their pupils are attending to them without asking questions. They look or act as though they were attending, and so the teachers who believe this conclude they are. *Conclude*, I say. Note the word. It denotes a process of reasoning. And when we study the minds of others, we have to do it by processes of reasoning — by acts of inference.

Inferential Method. — You do not even know that there is any one in the world besides yourself except by a process of reasoning. When you say you see a man, the truth is that you have sensations of color, and from this fact infer the presence of a human being like yourself. When you see this human being laugh, you infer that he is amused, just as you are conscious of being amused when you laugh. All that you learn of any human being you learn by reasoning — by inference. As, then, we call the method of studying our own minds the *introspective* —

since we study them by looking directly within — so we may call the method of studying the minds of others the *inferential*, since we do it by processes of inference.

The Inferential Method and the Study of History. — Whatever you learn about the minds of others — whether you learn it from what you see them do, or what you read about them — you learn by means of the inferential method. When you learn how Washington exposed himself when Braddock's army was routed, and at the battle of Princeton, you infer that he was brave, precisely as you would have done if you had seen him. Since all the facts of human history relate to the actions of men, they are materials which the inferential method uses to increase our knowledge of human nature. When we learn, for example, that the ancient Greeks left their weak children exposed, in order that they might die, the inferential method enables us to see that Greek fathers and mothers did not love their children as fathers and mothers love their children now, and that they probably loved their country more, since a weak child was considered of no worth because it gave no promise of being able to be of service to the State. When we know that Aristotle said that all that was necessary to reform or relax the manners of a people was to add one string to the lyre or take one from it, the same method enables us to see that the Greeks had a susceptibility to music of which we can scarcely have any idea to-day. When we know that "those doughty old mediæval knights despised the petty clerk's trick of writing, because, compared to a life of toilsome and heroic action, it seemed to them slavish and unmanly," we know that they looked upon a very different world from ours —

a world of different aims and ideals; that the knowledge we prize so highly, and toil so painfully to gain, was a thing of no value in their eyes. The inferential method even uses the relics of the prehistoric ages to add to our knowledge of men. It takes the rough tools of the cave-dwellers and forces from them a little knowledge of the strange men who used them.

Inferential Method and the Study of our own Minds. — I have said that the introspective method is the method we use in studying our own mental facts. That needs qualification. It is possible for us to study our own minds by means of the inferential method. People often forget their motives for their actions. They say: "I do not know how I came to do that." In such cases they can learn their motives only by means of the inferential method, precisely as though they were other people whose actions they were considering, and which they were trying to account for. It is doubtless true, as we shall see in a later chapter, that in many cases there is *no* reason in the sense of conscious motive. Some idea suggested the action, and the action was straightway performed in the entire absence of anything that can be called reasoning. Further, the introspective method can only give us individual facts. As the bodily eye only sees isolated objects, and can not connect them by laws, so the eye of the mind only sees isolated mental facts, and can not connect them together by laws. In other words, we observe facts — not laws. Laws are the result of inference — never of direct observation.

The introspective and inferential methods, then — the two methods of studying mind — evidently sustain a close

relation to each other. You can, indeed, use the introspective method without the inferential, in the mere collection of facts; but you can not use the inferential at all without the introspective. When you infer that people have such and such mental facts under such and such circumstances, it is because you know by introspection that you have the same mental facts under the same circumstances. The laughter and tears of others would have no meaning to you if you had never known amusement or sorrow.

Difficulties of the Inferential Method. — Each of these methods has its peculiar difficulties. The results reached by means of the inferential method are always more or less uncertain. If you have ever made a thorough study of the history of any great man, you have doubtless had an excellent illustration of this. While different historians generally agree substantially as to the actions of men, they differ very widely in their interpretations of those actions. Federalist historians, and those who sympathize with them, usually regard Jefferson, for example, as a demagogue, while Democratic historians regard him as an exalted and devoted patriot. The reason of course is that, using the inferential method, the one explained his actions by one set of mental facts, the other by another.

Illustration. — A passage in John Fiske's *The Beginnings of New England* gives such an excellent illustration of the inferential method and its difficulties that it deserves to be quoted at length:

"It is difficult for the civilized man and the savage to understand each other. As a rule, the one does not know

what the other is thinking about." And then, speaking of Eliot, and what the Indians thought about him, the author goes on: "His design in founding his villages of Christian Indians was in the highest degree benevolent and noble, but the heathen Indians could hardly be expected to see anything in it but a cunning scheme for destroying them. Eliot's converts were for the most part from the Massachusetts tribe, the smallest and weakest of all. The Plymouth converts came chiefly from the tribe next in weakness — the Pokanokets, or Wampanoags. The more powerful tribes — Narragansetts, Nipmucks, and Mohegans — furnished very few converts. When they saw the white intruders gathering members of the weakest tribes into villages of English type, and teaching them strange gods while clothing them in strange garments, they probably supposed that the pale-faces were simply adopting these Indians into their white tribe as a means of increasing their military strength. At any rate, such a proceeding would be perfectly intelligible to the savage mind, whereas the nature of Eliot's design lay quite beyond its ken. As the Indians recovered from their supernatural dread of the English, and began to regard them as using human means to accomplish their ends, they must, of course, interpret their conduct in such light as savage experience could afford. It is one of the commonest things in the world for a savage tribe to absorb weak neighbors by adoption, and thus increase its force preparatory to a deadly assault upon other neighbors."

Difficulties of the Introspective Method. — The great difficulty with the introspective method is that a mental fact vanishes as soon as you begin to examine it introspec-

tively. The feeling of amusement, of course, is a mental fact. The next time you are amused, suppose you try to analyze the feeling. Some psychologists say that it consists in part of a feeling of superiority. If you make a study of your experience to see whether they are right, your feeling of amusement will disappear. Or suppose you try to ascertain what sort of a mental fact pity is. When you find yourself pitying some one, if you examine your experience to see what pity is, the feeling will vanish. If the nature of flowers were such that they disappeared the moment one began to observe them closely, the study of Botany would exactly illustrate the difficulty of studying the mind by means of the introspective method. And as, in such a case, the botanist would have to content himself with observing his facts in the dim light of memory, so also must the psychologist. As his facts disappear the moment he begins to examine them, his only resource is to appeal to the memory — his introspection becomes retrospection.

Study of Children. — Of course the minds that are of the most importance for you as teachers to study are the minds of children, and it is evident that you must study them by means of the inferential method. If you would get that knowledge of them that will enable you to teach them well, you must note their likes and dislikes, their amusements, their games, the books they read, the mistakes they make — everything, in short, that may throw light on their minds. Do not rely on any knowledge of the mind you can get from this or any book. A good book on Psychology is like a guide in a strange city — useful chiefly in telling you where to look. But, as a guide

is of no service to a man who refuses to use his eyes, so a writer on Psychology can be of little use to his readers unless they constantly test his statements by their own experiences and by the study of the minds of those around them.[1]

QUESTIONS ON THE TEXT.

1. What kind of mental facts constitutes the science of Psychology? Illustrate.
2. What is a law of mental facts? Illustrate.
3. State and explain and illustrate the two ways of studying mental facts.
4. Illustrate how the inferential method uses historical facts to enlarge our knowledge of mind.
5. How can you study your own mind by means of the inferential method?
6. Point out the relations that exist between the two methods.
7. State and illustrate the difficulties of the two methods.

SUGGESTIVE QUESTIONS.

1. Are there any mental facts which do not form part of the science of Psychology?
2. Do you know any facts which indicate that there is a difference in the keenness of internal perception in different people?
3. If you were a Turk or a Chinaman, and knew nothing of any other people, how would it influence your notion of human nature?
4. Is pity a state of pleasure?
5. How does the quotation from Fiske illustrate the difficulties of the inferential method?

[1] For a brief explanation of some varieties of the inferential method, *see* Appendix B.

LESSON X.

NECESSARY TRUTHS AND NECESSARY BELIEFS.

We would all agree that Geometry does right to state its axioms at the beginning. All its demonstrations depend upon them, and therefore it is proper that they should receive our attention at the outset.

What we can Learn by Means of the Introspective Method. — For similar reasons it is important for us to ascertain as clearly as possible what we can learn by means of the introspective method. Since the introspective and the inferential methods are the only methods of studying mental facts, and since the inferential is based on the introspective, what we learn by means of the introspective method lies at the foundation of our knowledge of mind. If you were building a house, you would be especially careful about the foundation. You would want it all strong and well made, but you would take particular pains to see that there was no flaw in the foundation. No matter how strong and fine and beautiful the rest of the house might be, you would feel that if the foundation was weak the whole thing might come tumbling down about you any day. So it behooves us to look carefully to the foundation of our knowledge of mind, and therefore to ascertain precisely *what kind of knowledge* we have of the

facts known to us through introspection, and *what we can learn* by means of it.

But the knowledge gained by introspection so closely resembles another kind of knowledge that the two are liable to be confused, unless at the outset the latter is clearly explained. To this end permit me, in imagination, to talk with you about some familiar matters.

"Have you ever seen a stick with but one end, or a white crow?"

"No," you answer.

"Do you think it possible that you ever will?"

"Possible to see a white crow? Certainly there is no impossibility in that. I know no reason why a bird might not exist like the crow in every respect except the color of its feathers. But a stick with one end? That is not merely an impossibility; it is an absurdity. You can not even assert its existence."

"Pardon me, but I think you are mistaken. 'This stick has but one end.' Have I not asserted its existence?"

"Apparently, but not really. You have indeed strung a lot of words together in the form of a sentence—a sentence to which I have no objection on the score of grammar. But there is one fatal objection to it: it does not mean anything."

"Does not mean anything? I do not understand you."

"Your statement does not express any action of the mind. All sentences that mean anything are expressions of thought. But when you say, 'This stick has but one end,' you have simply used your organs of speech; you have not *thought* anything. I might teach a parrot to say, 'Kant's arguments in defense of the antinomies of human reason have never been refuted.' But what would those

words mean in the mouth of a parrot? Nothing, and that is all you mean when you assert the existence of a one-ended stick."

"Possibly I am stupid, but I really do not see why."

"For this very simple reason: The word 'stick' means a thing that has two ends. When, therefore, you say, 'This stick has but one end,' it is equivalent to saying, 'This two-ended thing has but one end; this thing, which has two ends, has but one end.' Now it is easy enough to *say* that, but impossible to think it, is it not?"

"I see that it is. A thing can not have two ends and but one end at the same time; it can not both be and not be."

Necessary Truths. — This is an example of what metaphysicians call necessary truths[1] — "a truth or law the opposite of which is inconceivable, contradictory, nonsensical, impossible."[2] A little reflection will enable us to think of many others. Two straight lines can not inclose a space; two + three = five; these are examples of necessary truths because the opposite of each of them is inconceivable, contradictory, nonsensical, impossible. If two straight lines could inclose a space, they could be straight and crooked at the same time; if two + three could be more or less than five, it could be itself and not itself at the same time, which is absurd, contradictory, impossible.

To determine whether a proposition expresses a necessary truth or not, we must see if we can put any meaning into the proposition which contradicts it. But in applying the test we must be on our guard against confusing

[1] These are sometimes called intuitions.

[2] Ferrier's *Institutes of Metaphysics*, p. 20.

putting a meaning into the subject and predicate with *putting a meaning into the proposition.* "This square is round." Here both subject and predicate bring up familiar ideas. But a moment's reflection enables us to see that the intelligibleness of the subject and predicate is a very different thing from the intelligibleness of the proposition. For if the square is round, it is itself and not itself at the same time, which is unthinkable and impossible.

Necessary Beliefs. — Let us now turn our attention to a class of propositions that, at first sight, look very much like necessary truths, but which, nevertheless, are fundamentally different. You go to your room on a cold winter morning and begin to build a fire. "Why do you build a fire?" I ask. "Because it is cold." "What makes you think that a fire will make it warmer?" "Because it did so yesterday, and the day before, and the day before that — because it always has done so in the past." "But what has the past to do with the present and the future? *How do you know that things will behave in the future as they have done in the past?*" I can not answer the question; I do not believe any one can. The past, as Bain says, is separated from the future by a chasm which no resources of logic will ever enable us to bridge.[1]

[1] "The most authentic recollection gives only what *has been*, something that has ceased and can concern us no longer. A far more perilous leap remains, *the leap to the future.* All our interest is concentrated on what is yet to be; the present and the past are of value only as a clue to the events that are to come.

"The postulate that we are in quest of must carry us across the gulf, from the experienced known, either present or remembered, to the unexperienced and unknown — must perform the leap of real inference. 'Water has quenched our thirst in the past; by what assumption do we affirm

But while we "can give no reason or evidence" that "what has been will be," that things will behave in the future as they have done in the past under precisely similar circumstances, the peculiar fact is that we do not want any. When we know that a thing has happened in the past, we are entirely sure that it will, under similar circumstances, in the future — *so sure that we can not help believing it even if we would.*

Necessity of Necessary Truths and Necessary Beliefs. — This is one of the reasons why we may properly call such beliefs necessary — the fact that we can not rid ourselves of them. But while they share this characteristic of inevitableness or necessity with necessary truths, the necessity in the two cases is of a very different character. The necessity of necessary truths is a necessity of *seeing;* the necessity of necessary beliefs is a necessity of believing. We *know* with *absolute certainty* that two straight lines *can not* inclose a space; we *believe* with irresistible strength of conviction that what has been will be, under similar circumstances — not that it *must* be. We can not even think of two straight lines inclosing a space; we can very easily think of this orderly universe becoming a chaos in which there would be an utter absence of law and order, in which combustion would be followed by heat one day, cold another, and so on. The necessity, then, of necessary beliefs is a necessity of belief, not of knowledge. We do

that the same will happen in the future?' Experience does not teach us this; experience is only what has actually been; and after ever so many repetitions of a thing there still remains the peril of venturing upon the untrodden land of future possibility. 'What has been will be,' justifies the inference that water will assuage thirst in after-times. We can give no reason or evidence for this uniformity." — Bain's *Logic*, p. 671.

not *know*, strictly speaking, that the thing we believe so firmly is true, but we believe it with irresistible strength of conviction, notwithstanding.

Some of our necessary beliefs — for instance, the one we have been considering — have another kind of necessity. If we did not assume that the past would enable us to judge of the future, all rational action would be impossible. Take that belief from the minds of men, and their rational activities would cease as suddenly as though they had been transformed into stone. I eat when I am hungry, drink when I am thirsty, rest when I am tired — do everything which I do under the influence of that belief — so far as my actions have any rational basis. The farmer sows, the mechanic builds, the lawyer prepares his brief, the doctor writes his prescription, because each thinks that a knowledge of the past enables him to anticipate the future more or less accurately.

The principle, then, that what has been will be, is necessary not only in the sense that we can not get rid of it, but also in the sense that we must believe it in order to live in the world. If a being were born in the world destitute of the tendency or predisposition to accept the past as in some sense a type of the future, he would necessarily perish.

Of necessary beliefs of this class it is absurd to raise the question as to their truth. Though we are not prevented from questioning them by the very nature of our minds — as in the case of necessary truths — still, if we must accept them in order to act and live, the possibility of questioning them will remain a bare possibility.

But if we have beliefs that are necessary in the sense that we can not get rid of them, but not in the sense that

we must accept them because of their practical importance, it is evident that the question as to their truth is altogether in order. A dozen different branches of science — physics, chemistry, physiology, astronomy, etc., as well as Psychology — have shown us very clearly that many of the things which *seem* to be true — and which continue to seem to be after we know they are not — are false. The sun still seems to rise and set, although we know it does not. To call a halt to investigation, therefore, on the threshold of necessary beliefs of this character would amount to an attempt to protect Error against the assaults of Truth.

QUESTIONS ON THE TEXT.

1. What is the relation between the introspective and inferential methods?
2. Why is it important for us to learn what we are conscious of?
3. State the difference between a necessary truth and a necessary belief.
4. Can you doubt a necessary belief?
5. What are the two classes of necessary beliefs?
6. Can you question the truth of a necessary belief?
7. What is the difference in meaning between questions four and six?

SUGGESTIVE QUESTIONS.

1. Make as complete a list as you can of what you regard as necessary truths.
2. What do you suppose the phrase, "entertain the idea," originally meant?
3. You believe many things because, as you say, you remember them. Are the assertions of memory examples of necessary truths, or necessary beliefs, or neither?
4. What does Bain mean by the "leap of real inference"?

5. Mention some other necessary beliefs besides the one spoken of in the lesson.

6. Mention some that are necessary in the sense that we can not help believing them, but not necessary in the sense that the nature of the world compels us to assume them.

7. Mention some things that seem to us to be true, although science has shown that they are not.

8. What is meant by the "uniformity of nature"?

LESSON XI.

WHAT ARE WE CONSCIOUS OF?

The object of the last lesson was to make clear the distinction between necessary truths and necessary beliefs. I tried to show that there are truths that the mind *must see* when it clearly grasps the subject and predicate of the proposition that expresses them. But the mind by no means inevitably sees all the necessary truths it is capable of seeing, because there are subjects and predicates that are beyond its grasp at certain stages of its development, and others that it might grasp, but which, as a matter of fact, it has not grasped. "Seven plus five makes twelve" is a necessary truth. But the child does not see it, because he can not grasp *seven* and *five*. *A necessary truth, then, is not a truth that the mind must see, but one which, when seen, is seen to be necessary.*

Necessary beliefs resemble necessary truths in that we are not only willing, but, in a measure, forced to believe them, in the absence of reason and evidence. Indeed, we are certain both of necessary truths and necessary beliefs; but our certainty differs widely in the two cases. In the one, it is a certainty of knowledge; in the other, of belief. Moreover, the necessity of necessary beliefs, unlike that of necessary truths, is not in all cases absolutely unyielding in its nature. When we look through an opera-glass

we can not help seeming to see the object much nearer than it really is. Such irresistible "seemings" we call beliefs until we learn that they are false, but no longer. This is one of a multitude of instances in which what seems to be true is directly opposed to what we know to be true. It would appear, therefore, only a matter of common prudence to accept as true only those necessary beliefs which we can not get along without.

Reasons for Studying the Nature of Necessary Truths. — Necessary truths, necessary beliefs, and what we are conscious of, then, constitute the foundation of everything we know and believe, not only about mind, but about the world in general. Now that we know what necessary truths and necessary beliefs are, it will be comparatively easy for us to determine the kind of knowledge that consciousness is, and the kinds of facts of which we are conscious. If we had attempted to learn what consciousness is before making a study of necessary truths, there would have been great danger of our confusing the knowledge of the facts that we are conscious of, with the knowledge of necessary truths.

Nature of Conscious Knowledge. — Let us first try to ascertain what that kind of knowledge is that we call conscious knowledge. For to ask what kind of facts we are conscious of is to ask what we know *in precisely the same way, with the same kind and degree of certainty, that we do the facts which every one admits we are conscious of.* Every one admits that we are conscious of the mental facts we know by introspection. Evidently, in order to learn whether we are conscious of anything else, we need

to learn whether we know anything else in the same way, and with the same kind and degree of certainty; we need to learn whether our knowledge of any other facts *has the same characteristics as our knowledge of mental facts.* When Columbus first came to this country, if he had been told that certain animals that he saw were buffaloes, he would have had to learn their characteristics in order to be able to recognize buffaloes when he saw them again. Knowing their characteristics, he would have been able to recognize a buffalo as easily as a horse or dog. In like manner, since we are conscious of those facts which we have agreed to call mental facts, we have to learn the characteristics of our knowledge of mental facts, in order to learn whether we are conscious of anything else. For if our knowledge of anything else has the same characteristics as our conscious knowledge, it also must be conscious knowledge. What, then, are the characteristics of the kind of knowledge that every one admits to be conscious knowledge?

Have you ever been in pain? Suppose that, while you were writhing in agony, some one had asked you if you were sure you had any pain. How do you think you would have answered the question — if, indeed, you had possessed the patience to answer it at all? You would have said, I think, that your certainty was so great that it *could* be no greater. Put so much water into a glass, and not another drop, not an *atom* more can you make it hold. So, you would have said, certainty beyond or greater than yours it was impossible for any conscious being to have. "But may you not be deceived — may not your pain be a mere illusion, like the experiences of your dreams?" your questioner might have asked. "Deceived as to being in

pain, when I am literally writhing in agony? *No!* I know it so absolutely that I know that I *can* not be mistaken. There is much that I believe that I realize I may be mistaken in. But this is *certainty* — certainty that admits of no doubt — certainty that makes doubt an absurdity and an impossibility." Conscious knowledge, then, is absolutely certain knowledge — knowledge so certain as to make doubt an absurdity and an impossibility.

Difference between Knowledge of Necessary Truths and Conscious Knowledge. — But this, we have seen, is exactly what the knowledge of necessary truths is. We know that two straight lines can not inclose a space so certainly as to make doubt an absurdity and an impossibility. Is there no difference between the knowledge of necessary truths and conscious knowledge?

If we compare the attitude of our minds towards a necessary truth with its attitude towards a mental fact, I think we shall see a difference. Two straight lines can not inclose a space. Where? In England, on the sun, wherever straight lines are, we know that they can not inclose a space. Our knowledge is not of an individual fact, with which the mind seems face to face, but of an entire class of facts, wherever they may exist. But our knowledge of a pain, for example, although it is like our knowledge of a necessary truth in the *kind and degree of certainty* that it gives us, differs from it in being *knowledge of an individual fact with which the mind seems face to face — of which the mind seems directly aware.*

Conscious knowledge, then, is absolutely certain knowledge of individual facts of which the mind seems directly aware. Instead, then, of asking whether there are any

facts except mental facts that we are conscious of, we can put the question in this form: Are there any facts except mental facts with which the mind seems face to face, and which we know with such absolute certainty as to make doubt an absurdity and an impossibility?

Are you Conscious of the Stars? — Perhaps, some evening shortly after reading this lesson, you will take a walk. As you glance at the stars shining so brightly above you, you think of the subject of the lesson, and ask yourself if you really are conscious of them. Do you, as you see those little twinkling points of light in the heavens above you, *know* that they exist, so certainly, so *absolutely*, as to make doubt an impossibility?

The fixed stars, as we know, are almost inconceivably far away. They are so far away that astronomers never think of stating their distance in miles. Instead of telling us their distance in miles, they tell us how long it takes light to travel from them to us. Now, light travels about 180,000 miles in a *second*, and the nearest of the fixed stars is so far away that it takes light *three years* to come from it to us. Suppose, then, that the nearest fixed star had been destroyed two years and a half ago. Would you see it to-night? Certainly, just as you see any other star; for the light that strikes your eyes as you look at it left it two years and a half ago — six months before it was destroyed. And for the same reason you would see it to-morrow night, and the next, and so on for six months. Night after night for six months you would see the star shining above you, although it did not exist at all. When, then, I ask if you *know* that the stars exist as you look at them, evidently the most you can say is that they do,

unless they have been destroyed since the light left them by which you now see them. But if that is your answer, you can not say that you know that they exist so absolutely as to make doubt an impossibility, for you do not know that they have not been destroyed since the light left them which enables you to see them. Therefore you are not conscious of them.

Are you Conscious of the Objects about you?— "But at any rate," perhaps you will say, "I am conscious of the objects about me. I take a walk, and I see the beautiful bouquets of autumn adorning the hill-sides. I see the fields stretching out before me, and here and there a farmer busy at work. As I mark how the leaves of the hedge were nipped by last night's frost, a rabbit suddenly leaps from under my feet, and I wish for my gun as he fairly flies away from me. Surely," you will say, "you will admit that I am conscious of these things."

Are you? Put the question to yourself. Ask yourself if you *know* that these things exist so *absolutely* that doubt is an impossibility. Do you like hunting? If so, I am sure you have dreamed of standing behind a trusty pointer, gun in hand, ready to take the first quail that made its appearance above the weeds. And while you are in the midst of your excitement you awake perhaps to find that you have neither dog nor gun — to find that you have been hunting only in a dream. "What of it?" you ask. This: A certainty quite as great as — indeed indistinguishable from — your waking certainties proved untrustworthy; *may* not your waking certainties be unreliable? You will not, of course, imagine that I doubt that I see and hear the various things which I seem to see and hear, or that

I am trying to make you doubt them. I am simply trying to show that you do not know them with the same absolute certainty that you do the *mental* facts of your experience, and that, therefore, you are not conscious of them.

Strongest Argument that we are not Conscious of External Objects. — But these arguments, conclusive as they seem to me, are not the considerations which are entitled to most weight. Simply by looking into my own mind, I know that I do not know the existence of the objects about me with the same kind and degree of certainty that I do the mental facts I am conscious of, and therefore I know that I am not conscious of them.

Look carefully into your experience, and you will see that the only facts which you know with absolute certainty are the facts of your own mental life. You will need no arguments to prove that you *can* not have absolute knowledge of any other individual facts — you will see that you *do* not so clearly as to make argument superfluous. But if you do not, permit me to ask you to hold your judgment in suspense until you have had more experience in the study of mental facts. You would take the opinion of a sailor as to the character of a distant object at sea in preference to your own, simply because of his more extended experience. Inasmuch as trained psychologists, almost without exception, contend that we are not conscious of the objects about us, I ask you to hold your judgment in suspense until you have studied the subject long enough to give you a right to an opinion.

Not Conscious of our own Bodies. — It seems to me equally clear that we are not conscious of our own bodies.

A man with an amputated limb often feels pain in the amputated member, exactly as he does in any other part of the body. But he can not be conscious of the amputated limb. You admit that. You admit that a man can not be conscious of a leg that has been buried for months. Well, if he *seems* to be conscious of the amputated member and is not, *he has no reason to believe that he is conscious of a member that is not amputated because he seems to be.*

I think we may conclude, therefore, that we know no other individual facts with the same kind and degree of certainty that we do the facts of which we are conscious; and that, therefore, we are conscious of nothing else.

QUESTIONS ON THE TEXT.

1. What is the foundation of all we know and believe?

2. What is the difference between our knowledge of a necessary truth and our knowledge of a mental fact?

3. Are you conscious of the stars? Of the objects about you? Of your own body?

4. Give your reasons for your answers.

5. If you believe that you are not conscious of anything except mental facts, state what you regard as the strongest reason for your opinion.

SUGGESTIVE QUESTIONS.

1. Give examples of necessary truths that are beyond the grasp of a savage.

2. How do you account for the effect of looking at an object through an opera-glass?

3. What is the difference between real pain and imaginary pain?

4. "In this wonder-world a dream is
Our whole life and all its changes,
All we seem to be and do
Is a dream and fancy too.
Briefly, on this earthen ball
Dreaming that we're living all."

What part of these assertions do you *know* to be false?

5. How do you account for the fact that a man often feels pain in an amputated limb?

LESSON XII.

ATTENTION.

Sensation and Attention.—We have seen that conscious knowledge is that knowledge which we have of those mental facts which we know directly. We have learned also that there are mental facts of which we are not conscious. You remember the example—a student intent upon a book and not hearing the clock strike till a moment after. What is the explanation of such facts? The attention of the student was so fixed upon this book—his entire consciousness was so concentrated upon it—that there was no consciousness left for the sensation. Thus *the sensations of which we are conscious depend upon attention.* In his *Mental Physiology,* Carpenter gives some remarkable examples of this. For instance: "Before the introduction of chloroform, patients sometimes went through severe operations without giving any sign of pain, and afterwards declared that *they felt none:* having concentrated their thoughts, by a powerful effort of abstraction, on some subject which held them engaged throughout." "The writer has frequently begun a lecture, whilst suffering neuralgic pain so severe as to make him apprehend that he would find it impossible to proceed; yet no sooner has he, by a determined effort, fairly launched himself into the stream of thought than he has found himself continu-

ously borne along without the least distraction until the end has come, and the attention has been released; when the pain has recurred with a force that has overmastered all resistance, making him wonder how he could have ever ceased to feel it." A similar experience in the case of Sir Walter Scott is thus recorded by his biographer: "John Ballantyne (whom Scott, while suffering under a prolonged and painful illness, employed as his amanuensis) told me that, though Scott often turned himself on his pillow with a groan of torment, he usually continued the sentence in the same breath. But when dialogue of peculiar animation was in progress, spirit seemed to triumph altogether over matter — he arose from his couch, and walked up and down the room, raising and lowering his voice, and, as it were, acting the parts. It was in this fashion that Scott produced the far greater portion of the *Bride of Lammermoor*, the whole of the *Legend of Montrose*, and almost the whole of *Ivanhoe*."

Perception and Attention. — What we *perceive* depends upon attention. Let a botanist and a geologist take the same walk — and the botanist will see the flowers, and the geologist the rocks, because each sees what he attends to. The next time you take a walk go along the most familiar road in your neighborhood, and see if you can not discover something new to you — some tree or shed that has been there all the time. I have often had that experience. The reason is that these unperceived objects were not attended to.

Memory and Attention. — What we remember depends upon what we attend to. Have you ever thought of it?

Most of our past lives is a perfect Sahara of forgetfulness — blank, bleak, barren — swallowed up in oblivion. But here and there gleam little green spots of memory, little oases in the midst of the mighty desert of the past. How is this? The things which we remember are the things which we attend to. Talk to an old man about his past life, and you will find that the events of the last year he but dimly remembers; but when he speaks of his boyhood, the incidents of the time crowd themselves upon him as though they had happened but yesterday. In that far-off happy time, when his heart was light and his mind was free from care, the most trivial events received a degree of attention sufficient to stamp them on his memory forever.

Recollection and Attention. — What we recollect depends upon what we attend to. (Recollecting is remembering by an *effort of will.* All recollecting is remembering, but all remembering is not recollecting. Recollecting is a *kind* of remembering.) What do you do when you try to recall the name of a friend which has slipped your memory for the moment? You think of — attend to the thought of — how he looks, of his dress, of some peculiarity in his manner, of the first letter of his name, of some place where you saw him, of something connected with him — until, by and by, his name flashes into your mind. All you did, you notice, was to attend to certain thoughts in your mind.

Reasoning and Attention. — What conclusions you reach depends upon what you attend to. To Newton, sitting in his garden, the fall of an apple suggested the

law of gravitation. Why? Because he fixed his attention upon the resemblance between the fall of the apple from the tree and the revolution of the moon around the earth. The chief difference between the man of great reasoning powers and the ordinary man is that the former notices remote resemblances—resemblances that escape the attention of the latter.

Feeling and Attention. — What we feel depends upon attention. The same author already quoted from (Carpenter) gives some remarkable illustrations of this: The celebrated German mathematician, Gauss, while engaged in one of his most profound investigations, was interrupted by a servant, who told him that his wife (to whom he was known to be deeply attached, and who was suffering from a severe illness) was worse. "He seemed to *hear* what was said, but either he did not comprehend it or immediately forgot it, and went on with his work. After some little time, the servant came again to say that his mistress was much worse, and to beg that he would come to her at once; to which he replied: 'I will come presently.' Again he relapsed into his previous train of thought, entirely forgetting the intention he had expressed, most probably without having distinctly realized to himself the import either of the communication or of his answer to it. For not long afterwards when the servant came again and assured him that his mistress was dying, and that if he did not come *immediately* he would probably not find her alive, he lifted up his head and calmly replied: 'Tell her to wait until I come' — a message he had doubtless often before sent when pressed by his wife's request for his presence while he was similarly engaged."

Volition and Attention. — What we *will* likewise depends upon attention. Suppose a boy has a lesson to get, and another boy invites him to go fishing. Will he go or will he stay and get his lesson? That depends on what he attends to. If he allows his mind to dwell on the fun he will have, if he does not permit himself to think of the consequences of neglecting his work, he will go. But if he keeps his mind firmly fixed on the consequences; if he vividly realizes the displeasure of his parents, the disapprobation of his teacher, the probability of losing his place in his class, he will stay.

Importance of the Part Played by Attention in our Mental Life. — This brief survey will enable us to form some idea of the importance of the part which attention plays in our mental life. I think you see that the chief difference between the educated and the uneducated man is the greater capacity of the former for close, continuous, concentrated attention. Some writers indeed have gone so far as to say that genius depends entirely on the power to concentrate the attention. Newton thought that the sole difference between himself and ordinary men consisted in his greater power of attention. This, I think, is an exaggeration. But however this may be, I think that the importance of training the attention can scarcely be overestimated.

Training of Attention. — How can we train the attention of our pupils? Precisely as we cultivate any other power of their minds — by getting them to attend. Our pupils learn to observe by observing, and to think by thinking, and to attend by attending. We never make

the mistake of assuming that our pupils have a high degree of reasoning power when they first go to school, that they are capable of solving difficult problems in arithmetic, or understanding abstract statements in grammar; and it is just as absurd for us to suppose that they are capable of continuous attention, and yet we are prone to do that. "Because people are attentive when strong interest is roused" — says Edward Thring — "there is a common idea that attention is natural, and inattention a culpable fault. But the boy's mind is much like a frolicking puppy, always in motion, restless, but never in the same position two minutes together, when really awake. Naturally his body partakes of this unsettled character. Attention is a lesson to be learned, and quite as much a matter of training as any other lesson. A teacher will be saved much useless friction if he acknowledges this fact, and instead of expecting attention which he will not get, starts at once with the intention of teaching it." How can he teach it? That question is of the utmost importance for us to be able to answer.

QUESTIONS ON THE TEXT.

1. Show (*a*) that the sensations of which we are conscious depend upon attention; (*b*) that what we perceive depends upon attention; (*c*) that what we remember depends upon attention; (*d*) that what we recollect depends upon attention; (*e*) that what we believe depends upon attention; (*f*) that what we feel depends upon attention; (*g*) that what we will depends upon attention.
2. Illustrate your answers from your own experience.
3. Illustrate the difference between remembering and recollecting.
4. How is the power of attention to be acquired?

SUGGESTIVE QUESTIONS.

1. "The botanist sees much in a plant; the horse-dealer in a horse; the musician hears much in a piece of orchestral music, of whose presence in the sense-perception the layman has no idea. From the same story each hearer interprets something different; out of the same laws each party interprets its right; the same turn of battle is proclaimed by both armies as a victory; out of the same book of nature the different readers, men and people, have gathered the most diverse things." (Volkmann.) How would you explain these facts?

2. Account for the truth embodied in the proverb, "There are none so blind as those that *won't* see."

3. Account for the use of *mind* in the following sentence: "I can't put my mind on anything to-day."

LESSON XIII.

ATTENTION.

(Continued.)

In the last lesson I tried to make it clear that our entire mental life is controlled by attention, in order that we may realize that the beginning of teaching is getting the attention of our pupils, and that the end of education is the developing of powers of attention, and directing those powers into right channels. An inattentive mind is an absent mind; and, as Thring remarks, a teacher "might as well stand up and solemnly set about giving a lesson to the clothes of the class, whilst the owners were playing cricket, as to the so-called class" if they were inattentive. Moreover, as the character of the mind depends upon the things it attends to and the manner in which it attends to them, evidently the object of education is to develop the power of attending to the right things in the right way.

Definition of Attention. — But what is attention? When you are reading an interesting book, you are scarcely conscious, if at all, of the sensations of pressure produced by your chair; carriages and wagons are clattering along the street, but you do not note them; various objects are directly before you, but you do not see them. Indeed, you are but dimly conscious of the sensations produced by the very type of the book you are reading. But the thoughts

called to your mind by your book stand out clearly and conspicuously in your consciousness — every feature, as it were, sharply defined. The act of the mind by which certain facts in our experience are thus emphasized and made prominent is called attention. *Attention, then, may be defined as that act of the mind by which we bring into clear consciousness any subject or object before the mind.* When you say to your pupils, "Give me your attention," you mean that you want them to stop thinking of the game they played at recess, of the book they read last night, of everything except what you are saying.[1]

Two Kinds of Attention. — Making another study of our experience, we find that there are two kinds of attention. You are reading a difficult and not very interesting book, when some one in the next room begins to sing your favorite song. You do your best to keep your attention on your book, but your mind wanders to the song in spite of you. Or you go to a lecture just after reading a letter that contained some very good news. You try to listen to the lecture, but the thought of the letter persists in dragging your mind away. In both these cases you are con-

[1] "Clear consciousness may be thought as the circle of those concepts" — experiences — "upon which attention rests. Experience shows us that this circle, like the pupil of the eye, can be extended or contracted within certain rather wide limits. The greatest narrowing occurs when we concentrate our attention upon a single object — as, for example, when we become absorbed in thought, or narrowly observe an outward phenomenon; the greatest extension takes place when we widen the bounds of the narrow consciousness to its greatest extent, in which case there would be really no concentration of mind and no attention. It is apparent that the width of the circle is indirectly proportioned to the clearness of its single points — *i.e.*, that our attention is so much the less intensive the more extensive it is." — Lindner's *Psychology*, p. 13.

scious of two very different kinds of attention — attention depending upon the will, or voluntary attention, and attention independent of the will, or non-voluntary attention.

We can see the difference between them more clearly, perhaps, if we bear in mind that, in the case of non-voluntary attention, there is but one thing that influences the mind — the thing attended to; while in voluntary attention there are two — the thing attended to and some reason or motive for attending to it. When you listen to a song simply because you like it, you attend involuntarily; when you keep your mind fixed upon a book by an effort of will, you attend voluntarily. In the first case, there are but two things concerned — your mind and the song; in the second, there are three — your mind and the book, and some reason or motive for attending to it. In the first case, you attend because of the attraction which the song has for your mind *directly;* in the second, you attend not because of any attraction which the book has for your mind, but because of *its relation to something else that attracts you directly*, as the desire to improve. Non-voluntary attention, then, is *that attention which results from the influence exerted upon the mind by the thing attended to, in and of itself;* voluntary attention is *that which results from the influence exerted upon the mind, not by the thing attended to, but by the knowledge of its relation to something else that attracts the mind in and of itself.*

Conditions of Voluntary Attention. — It is evident that voluntary attention is impossible without some variety of experience and some mental development. To attend voluntarily, we must perceive relations; and to perceive relations, the mind must have had experience, and must

be developed enough to interpret that experience. A bath may, almost from the beginning, give a child pleasant sensations. But his mind must be developed enough to perceive the relations between the preparations for his bath and the bath before the sight of the former can give him pleasure. Moreover, it is evident that the child must not only have had experience of relations in order to regard one thing as the sign of another; he must have not only some development of intellect to be able to connect things together, but also some development of his capacity for feeling, in order to be able to form ideas of things desirable in themselves. When the child is able to form the idea of a thing desirable in itself, and to see the connection between such a thing and something undesirable, the latter begins to be interesting *because of its relation to the former* — the conditions of voluntary attention exist.

Very Young Children Incapable of Voluntary Attention. — This analysis of the circumstances under which voluntary attention is possible prepares us to anticipate what observation confirms — that very young children are incapable of voluntary attention. Indeed, it seems probable that in the first days of a child's life there is no attention of any kind.

Mental Life of Very Young Children. — The mental life of a new-born child seems to consist of a mass of confused sensations, none of them coming into clear and distinct consciousness, because none of them are attended to. But the quality of some of its sensations, their character as pleasant or painful, causes the sensations that possess it to be emphasized in the child's experience. Bain well says

that "enjoyment, immediate and incessant, is a primary vocation of the infant mind."

Two Causes of Non-voluntary Attention. — "In the presence of the more enjoyable, the less enjoyable is disregarded." "Attention lasts so long as enjoyment lasts, and no longer."[1] So far as a child is under the influence of pleasure alone, these statements are true without qualification. But pain has fully as strong a hold on attention as pleasure. Moreover, as the same author remarks, "Intensity of sensation, whether pleasant or not, is a power." A bright light, a loud noise, "take the attention by storm." But in considering the effect of intensity of sensations upon attention, we must bear in mind that the greater their relative intensity — the greater, in other words, the contrast between the sensation and the other experiences of the child — the stronger will be its influence in attracting his attention. A remark made in an ordinary tone, for example, when it breaks in upon absolute stillness, will attract attention more strongly than one made in a very loud tone in the midst of noise and confusion.

Under the influence of these two causes — the quality of sensations or their character as pleasurable or painful — and their intensity, absolute and relative, the child's power of attention develops with wonderful rapidity.

As long as he is capable only of non-voluntary attention, he is at the mercy of his impressions. As the course of a stream depends upon the slope of the ground, so the direction of his attention depends upon the attractiveness of his sensations.

[1] Bain's *Education as a Science*, p. 179.

How the Power of Voluntary Attention is Developed. — But the exercise of non-voluntary attention develops the power to attend voluntarily. Every exercise of non-voluntary attention makes that kind of attention easier. Sensations less and less intense — sensations whose pleasurable or painful character is less and less pronounced — have power to attract it, in accordance with the universal law of the mind that exercise develops power. While the child's power of non-voluntary attention is in this way increasing, his growing experience is leading him to form *ideas* of things he desires, and to perceive the relation between the things that give him pleasure and the means of gratifying his desires. When this relation is clearly perceived, all the conditions of voluntary attention exist.

Probably the first exercise of distinctively voluntary attention usually occurs when the child is from three to six months old.

Experiment upon a Child. — Professor Preyer reports an instructive experiment made by Professor Lindner upon his little daughter, twenty-six weeks old, which experiment proves conclusively that the child was exercising voluntary attention:

"While the child, at this age, was taking milk as she lay in the cradle, the bottle took such a slant that she could not get anything to suck. She now tried to direct the bottle with her feet, and finally raised it by means of them so dexterously that she could drink conveniently. This action was manifestly no imitation; it can not have depended upon a mere accident; for when, at the next feeding, the bottle is purposely so placed that the child can not get anything without the help of hands or feet, the same performance

takes place as before. Then, on the following day, when the child drinks in the same way, I prevent her from doing so by removing her feet from the bottle, but she at once makes use of them again as regulators for the flow of the milk, as dexterously and surely as if the feet were made on purpose for such use. If it follows from this that the child acts with deliberation long before it uses language in the proper sense, it also appears how imperfect and crude the deliberation is, for my child drank her milk in this awkward fashion for three whole months, until she at last made the discovery one day that, after all, the hands are much better adapted to service of this sort. I had given strict orders to those about her to let her make this advance of herself."

What the Experiment Proves. — We must not forget to note that the conditions of voluntary attention were completely fulfilled in this case, and that it was only through this that the child's action was possible. If the child had not known by experience the relation between certain movements and the effects of those movements, she would not have been able to attend to those movements — in themselves uninteresting — in order to get hold of her bottle. And if her experience had not enabled her to form an idea of her bottle as a thing that gave her pleasure, it would not have been possible for her to fix her attention upon certain movements as a means of experiencing that pleasure.

QUESTIONS ON THE TEXT.

1. Why is it so important for you to know the conditions of attention?
2. Illustrate and define the two kinds of attention.

3. State and illustrate the conditions of voluntary attention.

4. Show that these conditions can not be fulfilled in the case of a very young child.

5. Describe as clearly as you can the consciousness of a new-born child.

6. What are the two causes of non-voluntary attention in a child's experience?

7. Show how the conditions of voluntary attention are gradually developed.

8. Analyze the voluntary attention exercised by Prof. Lindner's child for the purpose of showing that the conditions of voluntary attention were fulfilled.

SUGGESTIVE QUESTIONS.

1. Account for the miser's love of money.

2. Account for the knowledge of Prof. Lindner's child.

3. Make a study of any children you know of from two or three months to six or seven years of age in order to ascertain (1) the kind of objects that attract their non-voluntary attention; and (2) the lines of interests that control their voluntary attention after they are capable of exercising it.

4. President G. Stanley Hall says: "It is a striking fact that nearly every great teacher in the history of education who has spoken words that have been heeded has lived for years in the closest personal relations to children, and has had the sympathy and tact that gropes out, if it can not see clearly, the laws of juvenile development and lines of childish interests" (*a*) Who are some of the great teachers of whom he speaks? (*b*) In what way do you think their personal relations to children were helpful to them? (*c*) Do you know any important educational questions that can be best solved by a careful and systematic study of children? (*d*) Why is it important to know the "laws of juvenile development"? (*e*) Why the lines of childish interests?

5. Prof. Preyer's child gazed steadily at his own image in the glass when he was about four months old. Was that a case of voluntary attention?

LESSON XIV.

ATTENTION.

(Continued.)

COMPAYRE says that the way to teach the child to be attentive is to supply the conditions of attention. Nothing can be truer. But in order to do this, as he remarks, we need to know what the conditions of attention are.

To ascertain the conditions of non-voluntary attention was the object of the last lesson. We did, indeed, confine our investigations to the first years of childhood; but, as G. Stanley Hall remarks, "the living, playing, learning child . . . embodies a truly elementary Psychology." If, then, we were right in concluding that the two laws of non-voluntary attention — the two conditions upon which it depends in childhood — are the pleasurable or painful character of the child's experiences, and their intensity, we have reason to hope that we know the conditions that we need to supply in order to get non-voluntary attention, no matter what grade of pupils we are dealing with.

Universal Condition of Non-voluntary Attention. — I think we shall be quite sure of this if, pursuing our usual course, we make a study of our own experience and the experience of those about us. Why do you find it easier to listen to a speaker when you can see him than when

you can not? Because when you see him you have a much more vivid — intense — impression of him than you have when you do not. Why is it that to *see* a dentist extract the tooth of a friend affects you so much more strongly than to *think* of the same thing? Because the perception of a person in pain is a much more vivid experience than the thought of one. Why is it that pupils find it so much harder to attend to a teacher who speaks in a drawling, monotonous tone, than to one who speaks in a quick, lively, animated manner? Because the latter makes more definite impressions upon the mind. The monotonous speaker, moreover, is an unemphatic speaker; and in the absence of emphasis — of impressions having the character of intensity — there is nothing to particularly attract our attention to the leading idea, so that it is much harder to learn what that idea is. Why is it that you can remember an argument that you understand so much better than you can one that you do not understand? Because, when you understand an argument, you perceive the relations between its various parts; and the perception of relations is a source of pleasure, and therefore a stimulus of attention, and hence a help to memory.

Novelty a Non-voluntary Attention. — It appears, then, that in learning the conditions of non-voluntary attention in the early years of a child's life, we have learned what they are throughout the whole of his life. Some writers speak of novelty as a condition of non-voluntary attention, and under some circumstances it undoubtedly is. But why? Because the novel is the unexplained, and the unexplained excites our curiosity. But curiosity stimulates thought, and the exercise of the power

of thinking, under normal circumstances, is a source of pleasure. In a word, the novel attracts our attention because of the pleasurable character of the experiences connected with it. To prove this, we only need to recall the fact that, when we see a novel thing under such circumstances as not to excite our curiosity, it does not attract our attention. To the mind of a man who knows nothing of machinery, a complicated machine, however novel, offers no attraction. Indeed, a man who knew nothing of machinery would not know, without being told, that a particular machine was novel, unless its new features were of a very striking character. His ignorance of machinery would make it impossible for him to see the difference between the novel machine and those he was in the habit of seeing. If its new features were of such a striking character that he could not fail to notice them, he would regard it with a sort of vague wonder, but not with that keen, active curiosity which is such a powerful stimulus to attention. That is why the entirely familiar and the entirely unknown[1] are equally destitute of interest. Neither of them offers to the mind a problem to be solved; neither of them lures to exertion with the anticipation of a conquest over difficulties. The entirely familiar does not stimulate thought, because it is, or seems to be, the entirely known; the entirely unknown does not, because it offers to the mind nothing that it can take hold of. It is like a new ball of string, carefully wound up, with the ends so well concealed that there seems no way of beginning to unwind it.

[1] Of course it will be understood that I use the phrase "entirely unknown" relatively. Strictly speaking, the entirely unknown could not come before the mind at all

Physical Condition and Non-voluntary Attention. — So, again, the physical conditions of attention are insisted on, and, as we all know by experience, with entire propriety. When you are sick or tired, you can not attend as you can when you are well and rested. But why? Because things do not interest you so much. The relations between body and mind are so close that the mind is incapable of intense interest when the body is exhausted. That attention, then, is strongly influenced by bodily conditions is indeed true; but it is no new law: it is simply a case under the law already considered, that that which interests us, whether by its pleasurable or painful character, attracts attention.

We may conclude, then, that we have found what we are in search of, so far as non-voluntary attention is concerned — the conditions which we must supply in order to get it.

Let us now see how the case is altered by voluntary attention. As a matter of experience, how does the will influence attention?

Interest and Voluntary Attention. — Going to your room, you find a half dozen books on your table. There is *Vanity Fair*, a volume of Tennyson's poems, Stanley's *Dark Continent*, *Looking Backward*, a history of England, and a text-book on Geometry. Which will you read? If you were capable only of non-voluntary attention, you would read the one which attracted your attention most strongly. There would be a struggle between competing attractions, and the strongest would win the day. But through the influence of your will you may give your attention to precisely that subject which you like least. You do not like mathematics, but as you are going to be

examined in geometry, you begin to study that. Can you keep your attention on it *simply* by an effort of will? Certainly not. The will simply determines the direction in which the mind looks; but if it continues to look that way, it must find something to interest it — something to attract its non-voluntary attention. The will determines, in this case, that the attention shall be put on geometry; but if it stays there, it is because the subject develops some interest for the mind — stimulates its non-voluntary attention. Sully puts this very clearly: "By an act of will I may resolve to turn my attention to something — say a passage in a book. But if, after this preliminary process of adjustment of the mental eye, the object opens up no interesting phase, all the willing in the world will not produce a calm, settled state of concentration. The will introduces mind and object; it can not force an attachment between them. No compulsion of attention ever succeeded in making a young child cordially embrace and appropriate, by an act of concentration, an unsuitable and therefore uninteresting subject. We thus see that voluntary attention is not removed from the sway of interest. What the will does is to determine the kind of interest that shall prevail at the moment."

The Will and Voluntary Attention. — The last sentence states the work done by the will in attention very exactly. It creates no new influence; it simply determines which of pre-existing influences shall have control over the mind. Co-operating *with* a pre-existing influence, the will can make a weaker one prevail over a stronger. Without a prevailing influence to work on, the will is as powerless as a lever without a fulcrum.

But, upon second thought, have we not put this too strongly? Does voluntary attention always require a *pre*-existing influence in order to be effective? I do not think so. If the will resolutely turns the gaze of the mind upon a certain subject, points of interest, before unnoticed, may present themselves. The interest which alone makes concentration of mind possible may *result from* the exercise of the will, instead of existing before it. As the persuasions of a friend may induce you to consent to be introduced to a person who does not attract you, and whom you think you will not like, so the exertion of the will may induce you to attend to what you otherwise would not have attended to, because it revealed no attractions to such superficial glances as, without interest, are never given except in voluntary attention. Precisely as your new acquaintance may develop elements of attractiveness which you never would have known anything about if you had not consented to an introduction, so an uninteresting subject may become interesting under the searching gaze of voluntary attention, which otherwise would have remained uninteresting forever. And this is one of the functions of voluntary attention — "to develop interests, to make us acquainted with interesting subjects, of which we should have otherwise remained ignorant."

The Will and Concentration of Thought. — But there is another function of equal importance. What we call concentration of thought is a continuity of attention to the same subject. But this continuity is by no means insured when, under the influence of the will, the interests of a certain subject are present to the mind. If the will relaxes its hold upon the activities of the mind, the attention is

liable to be carried away by any one of the thousands of ideas that the laws of association are constantly bringing into our minds. As you use your will to give your attention to geometry, although it attracts you less than a number of other subjects, so, if you really *study* it, you use your will to prevent your mind from being dragged away from it by the interests that are constantly importuning you. He who possesses this power in a high degree possesses in a high degree the power of voluntary attention — to give steadiness to the mind, to prevent it from going capriciously here and there under the influence of the interests that happen to be present at the particular moment.

If the interests of the mind are the chief condition of non-voluntary attention, and if voluntary attention, to have any educational value, must start from, or result in, interests, we can put the two questions in which, as teachers, we are interested, in a more definite form. What is the end or object of education? What is teaching? The object of education, we have said, is to develop the power of attending to the right things in the right way; to teach is to get and keep the attention of our pupils by bringing their minds into contact with subjects that have an educational value. The one is the goal; the other seems the path by which we must reach it. The one is the end; the other seems the means by which we must attain it. But we now see that to develop the power to attend to the right things in the right way is to develop certain permanent interests in the mind, and to give it the power to determine, at any particular time, the interests by which the current of its thoughts shall be directed. We see also that, to get and keep the attention of our pupils by bring-

ing their minds into contact with subjects that have an educational value, we must make those subjects interesting; we must give their wills a fulcrum upon which to work.

Two Great Questions for Teachers. — We may then state our two great questions in this form: "(1) How can we develop those permanent interests that shall induce the mind to attend to the right things in the right way? (2) How can we interest our pupils in the subjects we teach?" Stated in this compact form, we see that we can not answer the first by answering the second. Life is larger than the school. When we have done all we can to make the subjects they study interesting to our pupils, the interests we have developed will have to compete with other interests, which the work of the school touches but indirectly and remotely. It will always remain possible for their wills to choose to foster the interests that check the growth of those we wish to make permanent. Moreover, the school is larger than the recitation. There are other influences — discipline, for example — which we can bring to bear upon the will besides those that directly result from the recitation.

In addition to these particulars there is another and much more important one, in which the answers to the two questions do not coincide.

Interests in Ideas and Interest in Ideals. — There are two radically different kinds of interests: interests in *ideas* and interest in *ideals*. In spite of what the Herbartians tell us, I maintain that any subject may be so taught as to make the interest aroused in connection with it almost altogether an interest in *ideas;* and that some subjects

can not be taught in such a way as to make them to any considerable extent a means of awakening interest in *ideals*.

Difference between them Illustrated by the Study of History. — Let us take history for an illustration. Taught in the right way, a study of it will develop in the pupil both kinds of interests. A pupil will be led to see the relation between events and their causes. He will see, for example, how the weak government of the Confederation was the natural expression of the lack of national patriotism, how the partialities of the Jeffersonian Republican party for France, in 1793, and of the Hamiltonian Federalist party for England, were the natural results of differences in temperament, surroundings and the like. This perception of the relation between events and their causes awakens an interest which illustrates what I mean by interest in *ideas*. It is purely *intellectual*. It may be felt by a man who thinks that the only mistake made by Benedict Arnold and Aaron Burr was in not succeeding. An interest in the perception of numerical relations, or of mathematical relations in general is of the same sort: it is an interest in *ideas* — not ideals.

But a pupil may also get from a study of history a radically different kind of interest. He may be led to see what the patriotic self-sacrifice of men has contributed to the making of our country what it is — that at every critical period men have been found who preferred to sacrifice their private comforts to the public good. And such perceptions may develop in him an admiration of genuine patriotism, and may slowly kindle in him a resolve to be true to the same lofty ideals of civic worth that seemed to animate them. This is an interest in *ideals*.

Distinctions of Fact and Distinctions of Worth. — The difference between the two may be clearly brought out by means of a distinction stated in Davidson's *History of Greek Education*, one of the best books, by the way, on the subject of education with which I am acquainted. There are, says Davidson, two kinds of distinctions: distinctions of fact, and distinctions of worth. We distinguish one thing from another thing; what is from what is not. Such distinctions are distinctions of fact. But sometimes our attention is directed to the relation between a fact and a certain ideal in our minds. We feel that such and such conduct not only *was*, but that it *ought to have been*, or that it *was*, but that it *ought not to have been*. Now the interests that grow out of distinctions of fact as such are interests in *ideas;* while the interests that grow out of distinctions of worth are interests in *ideals*.

This discrimination of interests in ideas from interests in ideals will serve its purpose if it helps us to see that no one has these permanent interests that induce the mind to attend to the right things in the right way unless he has interests in the right ideals as well as interests in ideas, and that teaching may be signally successful in awakening an interest in ideas, and as signally unsuccessful in awakening an interest in ideals. "All the boys hated him, and yet they all said he was the best teacher they had ever seen." A teacher of whom such a remark could be truly made was a good teacher only in the sense that he was successful in awakening an interest in ideas. No teacher who succeeds in stimulating interest in ideals can be an object of dislike. In order, then, that we may do what we can to develop these permanent interests that shall induce our pupils to attend to the right things in the right way, we

must do what we can to develop an interest in ideals as well as an interest in ideas.

QUESTIONS ON THE TEXT.

1. What are the two conditions of non-voluntary attention in the case of children?

2. Show that they are universal conditions of non-voluntary attention.

3. Why is it that novelty sometimes attracts our attention and sometimes fails to do it?

4. Show that the influence of novelty is a case of one of the two conditions already discovered.

5. Show that the influence of bodily conditions upon the attention is not a distinct law of attention.

6. State and illustrate the influence of the will upon attention.

7. What are the two functions of voluntary attention?

8. What is the most definite form in which you can state the two great questions which as a teacher it is your business to answer?

9. What is the difference between them?

10. Why is it so hard to understand unemphatic reading?

11. What is meant by "interests in ideals"?

12. What, by "interests in ideas"?

SUGGESTIVE QUESTIONS.

1. The end of education is often said to be "symmetrical development." In this lesson I say it is the development of certain permanent interests in the mind, etc. Are the two answers consistent?

2. "A few years ago, a gentleman brought two Eskimos to London — he wished to amuse and at the same time to astonish them with the great magnificence of the metropolis. For this purpose, after having equipped them like English gentlemen, he took them out one morning to walk through the streets of London. They walked for several hours in silence; they expressed neither pleasure nor admiration at anything which they saw. When their walk was ended, they appeared uncommonly melancholy and stupefied. As soon as they got home,

they sat down with their elbows upon their knees and hid their faces between their hands. The only words they could be brought to utter were, 'Too much smoke — too much noise — too much houses — too much men — too much everything!'" — Edgeworth's *Practical Education*. Account for the state of mind of the Eskimos.

3. What subjects in the school curriculum seem to you to be best calculated to awaken an interest in ideals?

4. Can the study of mathematical and physical geography be made to develop an interest in ideals?

5. What sort of discipline seems to you to be best calculated to develop an interest in ideals?

6. Under the influence of the intensity of his interest, the whole mind of an orator, in the midst of an oration, is brought to bear upon his subject. Ideas and images not connected with it do not come to his mind — as though for the time he had forgotten everything in the world except a certain group of related facts and ideas. Is this concentration of thought voluntary or involuntary attention?

LESSON XV.

ATTENTION.

(Continued.)

We have seen that voluntary attention is not "removed from the sway of interests," but that, to have any educational value, it must start from or lead to interests; that the two functions of voluntary attention are (1) the development of interests in things that would never give us pleasure were it not for voluntary attention; and (2) the development of the power of continuous attention, that the mind may direct its own energies — that it may not be a mere instrument, producing nothing but inharmonious sounds, because played upon by every passing impulse From this point of view we were able to see that the object of education is the development of certain permanent interests, and of the power to determine the course of one's activities; also that true teaching consists in bringing the mind into contact with subjects that have an intellectual and ethical value, in such a way as to make them interesting. This latter, as we know, is only another way of saying that true teaching consists in getting and keeping the attention of our pupils, and making the right use of it.

Rules for Getting Attention. — Let us begin, then, with the simpler question, How can we get and keep the

attention of our pupils? Comenius answered that question with remarkable completeness nearly three hundred years ago. In his time it was the custom to teach boys separately, or not more than two or three together. He contended that a lecturer could hold the attention of a large class just as well (1) "by always bringing before his pupils something pleasing and profitable; (2) by introducing the subject of instruction in such a way as to commend it to them, or by stirring their intelligences into activity by inciting questions regarding it; (3) by standing in a place elevated above the class, and requiring all eyes to be fixed on him; (4) by aiding attention through the representation of everything to the senses, as far as possible; (5) by interrupting his instruction by frequent and pertinent questions — for example, 'What have I just said?' (6) if the boy who has been asked a question should fail to answer, by leaping to the second, third, tenth, thirtieth, and asking the answer *without repeating the question;* (7) by occasionally demanding an answer from any one in the whole class, and thus stirring up rivalry; (8) by giving an opportunity to any one to ask questions when the lesson is finished."

Voluntary and Non-voluntary Attention both Necessary. — The hastiest glance at these rules will enable us to see that the teacher who conforms to them supplies the conditions of *both* voluntary and non-voluntary attention; and we need to carefully note the fact that we must do it if we hope to get and keep the attention of our pupils. A teacher who imagines that his work is done in this direction when he *interests* his pupils — in other words, when he supplies the conditions of non-voluntary attention — is

sadly mistaken. He can not get their non-voluntary attention until he begins to interest them; and he can not keep it afterwards simply by being interesting. *Until* he interests them, their attention, so far as it is non-voluntary, will be given to the most interesting thing that happens to come before their minds. *After* he interests them, instead of keeping their attention on what he *is* saying, they will continue to think about some interesting thing he *has* said, until their attention is attracted by something else.

In complying with a part of the first rule — in bringing before our pupils something pleasing — we are evidently supplying the conditions of non-voluntary attention by the *matter* of our instruction; in complying with a part of the second — "stirring their intelligences to activity by inciting to questions regarding it" — we are doing the same thing by the *manner* of our instruction; and the same is true of the fourth and eighth rules.

In bringing before our pupils something which they feel to be profitable; in teaching it so as to commend it to them; in occupying a position where we can see the entire class (a position that will make them feel that the teacher will be likely to know if they permit their minds to wander); in frequently calling upon them to reproduce what we have just said; in asking our questions promiscuously, without repeating them, when an incorrect answer is given — we are supplying the conditions of voluntary attention, giving them reasons for attending apart from the interest of the matter to which we wish to call their attention.

Importance of the Fifth Rule. — Every one of these rules for getting the voluntary attention of pupils is important; but I wish especially to call attention to two or

three of them. Of the fifth I will only remark that *no* teacher, below the university, who does not practice it habitually, has the attention of a majority of his pupils, no matter what grade of pupils he teaches. Moreover, unless some such rule is observed, it is hard to see how a teacher can be sure that his pupils understand him. We shall miss half of the importance of the first rule unless we bear in mind that when we can not see our pupils, they can not see us. What a hindrance that is to attention we shall realize if we try to listen to a speaker when we can not see him.

Necessity of Knowing the Educational Value of what we Teach. — But it is of the first and second rules that I wish particularly to speak. The more I think of it, the more I am convinced that the neglect of them is one of the principal causes not only of inattention in classes, but of a dislike for the work of the school in general. We too often fail to inform ourselves of the *educational value* of the subjects we teach. It too often happens that the best reason we can give for teaching geography, grammar, arithmetic, etc., is that we were taught them. Now, when we do not know why we require our pupils to study this and that subject, is it any wonder that our pupils do not know why they are required to study them? Boys know very well that they could spend their time to advantage if they could use it as they liked. They could go fishing or hunting or skating, and have lots of fun. They could work and get money, and have more fun. These things a boy *knows*. Is it any wonder that he does not like to go to school, when he has never been made to feel the value of an education? Is it any wonder that he makes no effort

to keep his mind from wandering when the teacher is talking about a lot of "stuff," as he calls it, because he has never been made to appreciate its value? "Is he to sit and toil day by day, and let the sun shine upon hill and dale, and he not see it? And let it gleam along the rivers, and glance in and out of the forest trees with scattered joyousness, and he not see it? Is he to miss the freshness of the air, the games, and the thousand and one delights that pass through the kaleidoscope of the boy mind, so fertile in fancy, so free? And all for what?"[1] For nothing, so far as he knows, unless he has been made to feel the value of an education. If you expect him to work, if you expect him to attend to you, you must make him understand, so far as you can, that it is a reasonable thing for him to do what you require. And you must make him realize what knowledge costs.

Educational Value of Geography. — Show him a map of Africa made twenty years ago, and show him a map of Africa as it is known to-day. Tell him of the toil and privations and hardships that Livingstone underwent to make the difference. Let him know, make him feel, that the knowledge which he can get so easily at school is the "piled up" life of some of the greatest and noblest men of the race. It is so easy to read that "the earth is round because men have sailed around it." But Drake and Raleigh and the other men who were among the first to make the voyage did it at the risk of their lives. Some of them, leaving pleasant homes and wives and children that they loved, exposed themselves to unknown dangers — the result of it all is a single line.

[1] Thring's *Theory and Practice of Education.*

Educational Value of Science. — It is hardly necessary to say that every subject we teach lends itself as readily to this kind of illustration as geography. Every niche, every arch, in that great and beneficent temple that we call science was put there by the toil and labor of men. Read how Newton first came to suppose that the fall of the apple and the revolution of the moon around the earth were due to the same cause; how he made long and laborious calculations only to find that the results of his calculations did not correspond with his theory; how he put his theory aside and found after many years that an error in his data had led to erroneous results, and that the results of his calculations from the true data were in harmony with his theory; or read how Kepler made hypothesis after hypothesis in trying to find the shape of the path of the planets in their revolution about the sun until at last when he had discovered the true one he was able to say: "I do think thy thoughts after Thee, O God"; read such incidents, and they will help you to understand what Fouillée means when he says we ought to *humanize* the sciences we teach: we ought, in other words, so to teach them as to make our pupils realize the human element in them — realize how they have grown and how they contribute to human well-being. The tendency of such teaching is to interest our pupils not merely in ideas, but ideals; is to stimulate them to form resolves to contribute their mite to the advancement of human happiness and knowledge.

But if we put Comenius's rule fully into practice, our pupils will learn to value education not merely for what it will *bring* them, but for what it will *make* them. They realize the difference between the boy who can read and

one who can not. The boy who can not read sees nothing but a piece of paper with black lines of all sorts and shapes upon it. But the boy who can read sees not merely paper with letters upon it, but the very mind of the man whose thoughts are materialized on the page before him. Make him feel that he possesses other dormant powers that you are trying to develop; make him feel that education will not merely give him better tools to use, but increase his power and skill in using them; make him feel that every lesson you assign is intended to lead to this end, and he will *try* to attend, whether he succeeds or not.

But to insure that his efforts will be successful, we must give his will a fulcrum upon which to work — we must develop interests.

Source of Interest. — The great secret of interest is adaptation. The toys and playthings and pictures of a child amuse him because they are adapted to his state of development — they stimulate him to exercise his powers. What we must do in teaching, if we expect to interest our pupils, is to set them to do something that they are able to do, in order that they may acquire the power to do what they can not do. We should constantly be striving at every stage of a child's development to learn the contents of his mind — to make an inventory of his capacities, so as to see which of them we can turn to educational account, and how. And here again we come upon the fact that meets us at every turn and corner of our experience in teaching — the necessity of a constant, careful, systematic study of our pupils, if we hope for the best success in teaching them. Unless we know them *thoroughly*, we can not adapt our teaching to them perfectly.

Questioning and the Law of Adaptation. — We all know that we can keep the attention of our pupils better by asking questions than we can by doing all the talking ourselves. The reason is found in the law of adaptation. When we are asking questions we are making the utmost use of the impulses of curiosity and activity. Children like to learn things, and they like to act. Ask the right kind of questions, and you make them conscious of their ignorance — you stimulate their curiosity. But here again the necessity of studying the minds of our pupils presents itself. The curiosity of little children is very different from that of older pupils. A child asks a question, and before you have answered it he asks another about an entirely different subject. His question was the result of involuntary attention; and since his interest in things in the form of curiosity is very slight, like a bird he flits from this subject to that, never staying with one thing a minute at a time. But this, as we know, is one of the things which we want to develop — this power of attention. So you will try to help him attend more and more closely to a subject, and to follow out a line of thought more and more persistently. When he asks a second question before you have answered the first, you will neither show nor feel impatience, no more than a mother does that her child is born without teeth. You will ask him questions about the first thing, keeping his mind upon it as long as you think it safe, learning a lesson from the bird, who does not encourage her young to make long flights the first time. You will be satisfied if you can make his curiosity a means of getting him to think a little and learn a little, being sure that in this way you can deepen it, and so get him to think more closely and acquire more knowledge.

Power of Enthusiasm. — It is due to the same principle — that what is adapted to us interests us — that to pupils the most interesting thing is the manifestation of that intense form of interest in the teacher that we call enthusiasm. Arthur Sidgwick well says: "Whether it be school lesson or subject of common talk out of school, the enthusiast drags the boy's mind captive. He makes him attend, he makes him interested, he makes him think. Without trying to do so, he makes learning seem attractive and delightful. Boys are naturally impressionable, and enthusiasm impresses; they are naturally imitative, and whatever they see a man keen about, they at once begin to excite themselves about it. Whether it be poetry, history, politics, art, science, natural history, or archæology, the enthusiast will at once make a school of his own imitators about him. And he will do far more than this. He will lift boy after boy out of the barbarous intellectual atmosphere in which the natural boy lives and moves, and make him conscious — though it be only dimly conscious — of the vast world of interest which lies around in every direction, waiting till he gird up his mental loins and come to explore. This is the real result of a master's enthusiasm — it cultivates. Under plodding, humdrum teachers, who will not put soul into their work, a boy may pass through a school from bottom to top, doing all the work so as to pass muster, and be a savage at the end. But let the enthusiast catch him, though but for a term, and the savage is converted."[1]

I can not forbear quoting what another English teacher says on the same subject: "To find the lesson oozing, as it were, from your finger tips; to be so full of your subject

[1] *The Practice of Education*, p. 63.

that the question is not what to say, but what to leave out; and to feel so well and vigorous that your vivacity compels attention and interest, and makes the faces in front of you look bright contagiously — *that* is how to prepare the lesson. . . . The story (told by the Professor at the Breakfast Table, I think) of a tailor lamenting over a customer departing empty-handed, that if it were not for a headache he would have a new coat on that back in spite of himself, is freighted with truth. There is a magnetic influence passing from a healthy and alert mind to all with whom it comes in contact; that influence is the teacher's conjuring wand, and without it he will never bring the dry bones of education to life. It will readily be seen that no patent process for the production or maintenance of this influence can be found. It is best fostered by variety of life; by a wide experience of men and things (not at all an easy thing for one so closely tied as a teacher to attain); in short, by anything that tends to keep the heart and mind open, and to make life interesting. Teachers lead too often very dull lives, and the dullness reacts on their pupils. Men and women who have to give out so much can hardly lead too full and rich and interesting lives. Their minds ought to be a storehouse of thoughts and pictures and recollections, from which they can draw at will to enrich their lessons and to furnish the minds of their pupils."

Importance of Interest in our Work. — It is indeed true that enthusiasm is a gift of nature conferred on but few teachers. But there is a degree of interest within the reach of every one of us, if we are willing to work for it. There is no danger that we shall lack interest in our subjects if we study them. When we think we know so much

about them that it is not worth while to study them any more, that very fact proves that we are lacking in interest. *But interest in our work is quite as essential as knowledge to success in teaching.*

QUESTIONS ON THE TEXT.

1. Summarize the results reached in the preceding chapters on attention.

2. State the rules given by Comenius, and show how each of them is related to the laws of attention.

3. Show that a teacher must supply the conditions of both voluntary and non-voluntary attention.

4. What is meant by "education values"?

5. What can we do to commend the subjects we teach to our pupils?

6. What is the secret of interest?

7. Describe the curiosity of little children, and state what should be done to deepen it.

8. What is an important object of questioning older pupils?

9. Explain and describe the effect of enthusiasm in awakening interest.

10. What is the point of the story told by the Professor at the Breakfast Table?

11. What is meant by "humanizing science"?

SUGGESTIVE QUESTIONS.

1. Dr. Arnold said: "The more active my own mind is, the more it works upon great moral and political points, the better for the school." Account for the fact.

2. Account for the influence of Sheridan at the battle of Shenandoah.

3. Describe the Socratic method of teaching, and account for its stimulating effect.

4. What are the education values of arithmetic, geography, grammar, and United States history?

5. Make a study of children, as you have opportunity, to ascertain the character of their attention — whether (*a*) it is easily distracted, or (*b*) hard to transfer from one subject to another.

6. What use can you make of that kind of knowledge of children?

7. How would you humanize the subject of chemistry?

LESSON XVI.

ATTENTION.

(Continued.)

In the last lesson we considered the question as to what we should do to keep the attention of our pupils during recitation. The wider question — the question as to the other means at our command to help us in cultivating the power of attention — has yet to be examined.

We learned from Comenius that one of the ways of keeping the attention of our pupils during recitation is to encourage them to ask questions; and we know that the reason is that in this way we stimulate their curiosity, and give them the pleasure of mental activity.

Curiosity of Young Children. — But our observations of children have enabled us to see that the curiosity of very young pupils is not strong enough to incite them to hard work. When they ask us questions, or when we ask them questions that they can not answer, if we do not answer them at once, they stop thinking about these questions, because they have so little curiosity.

Curiosity of Older Pupils. — But when we are dealing with older pupils, we should make a different use of the principle of curiosity. Their curiosity is strong enough to stimulate them to harder work. You can get their

attention by asking questions that will make them conscious of their ignorance; and the realization of this fact will often be a sufficient motive for vigorous exertion. *When* you should answer your question, your own tact must determine. It often happens that a student has interest enough in a subject to be clearly conscious of the labyrinth of difficulties in which the questions of his teacher have involved him, but not enough to make him willing to undergo the labor of threading his way out. Now, while we ought not to remove difficulties that have not been realized, or which the pupil's interest might induce him to overcome, there are circumstances under which the clearing up of difficulties may greatly increase his interest, and thus put him in the way of a more vigorous and protracted exertion of his powers. When the subject under consideration lies before his mind wrapped in a fog, a few direct, luminous, incisive statements from you may, like a brisk wind, clear away the fog and reveal the outlines of the country sharp and clear to your pupil's mind.

You may thus give him that experience that can be felt, but can not be described — that delightful consciousness of power which he realizes when, instead of groping in darkness in an unknown country, he finds himself at home, with a noonday sun to guide his footsteps. His feeling of weakness gives place to a feeling of power. Instead of feeling himself overborne and beaten back by a superior force, he is victor, and his enemies are flying, or rather annihilated, before him. This delightful experience, this stepping from darkness into light, this transition from mental chaos and anarchy into a region of order and law, is an exceedingly powerful stimulus.

School Lessons. — But if you are to make the most of the interest excited in this or any other way in recitation, you must follow it up. You have asked your pupil a question, and set him to thinking. His thoughts naturally take the shape of a series of questions, and he is eager to get answers to them. What does he need to deepen his interest? Books. Or by a few well-chosen statements you have set his mind in order. He knew a lot of facts, but he saw no connection between them. His mind was like a house into which a lot of new furniture had just been tumbled — everything was everywhere, and nothing was anywhere. Your statements have brought order out of chaos. You have enabled him to see that the various measures of Washington's first administration were a part of the carefully devised plan for strengthening the general government that emanated from the brain of the great Secretary of the Treasury. He at once becomes interested in Hamilton. What does he need to deepen this interest? Books. Or your class is studying Hawthorne's *The Great Stone Face.* And when they have become thoroughly interested in the strange and beautiful allegory, you tell them of the man who wrote it; of the quaint old town in which he lived and died; of Emerson and Thoreau, and the other famous men who lived there; you try to interest them in some of the great writers of American literature. But if your efforts are to result in any permanent deepening of their interest, they must have access to books.

Without further illustration, it is plain that if you are to make the most of the interest you have excited in recitation, you must be able to direct them to a library. Indeed, to develop interest in your pupils, and expect it to

be self-sustaining from the start, is as absurd as it would be for a farmer to take the utmost pains in preparing the ground, and then in planting corn, only to neglect it as soon as he saw the tiny blades peeping through the ground, with the idea that his work was then done. If the tiny blade is to grow into a stalk big enough to bear the golden grain, it must be carefully cultivated. In like manner, if the interest which teachers excite is to be anything more than a passing emotion, it must be fostered and cultivated; it must be fed by books.

"But libraries are expensive, and school committees and directors often refuse to buy them. What can *we* do in such a case, granting all that you say about their usefulness?" *You can so impress the idea of their importance upon the community as to see that they are got.* It is always to be borne in mind that a library is only a collection of books; and as any finite quantity, however small, is infinitely greater than zero, so any library, however small, is infinitely better than none. This, then, is one of the things which we can do to deepen the interests of our pupils, and so increase their power of attention. We can set them to reading books that will foster and nourish the interests that have germinated in our recitation rooms.

Discipline and Attention.—We can help our pupils in the same direction by a proper system of discipline. Carpenter well says: "The influence of a *system* of discipline by which each individual feels himself borne along as if by a Fate, still more that of an instructor possessing a strong will, guided by sound judgment (especially when united with qualities that attract the affection as well as

command the respect of the pupil), greatly aids him in learning to use that power. As Archbishop Manning has truly said: 'During the earlier period of our lives the potentiality of our intellectual and moral nature is elicited by the will of others.'" The hours of study should be short, especially in the case of younger children. But during those hours they should be put at work adapted to their state of development, and kept assiduously at it. No whispering should be allowed. The boy who whispers to another calls off his attention from his work — obstructs the formation of the very habit you are trying to develop, the habit of concentration. No disorder of any kind should be tolerated. With the utmost kindness, and at the same time with the utmost firmness, your pupils should be made to feel that the hours for study are for *study*. As soon as they can understand them, you should show them the reason for your requirements. You should make them feel that, in obeying you, they are obeying reason, and not arbitrary will. You should make them feel that you require what you require because you must, because you would be false to the trust reposed in you by the community unless you did. You should make them feel that they and you are associated together as pupils and teacher for the accomplishment of a definite purpose, and that whatever they or you need to do in order to accomplish that purpose must be done, that you no less than they have no choice but to do it. And when they can appreciate the truth of that noteworthy saying of Locke's, "The foundation of all virtue and worth consists in the ability to cross one's inclinations and follow the dictates of reason," you have in their own desire to reach a high ideal a powerful auxiliary.

School Programmes. — It would doubtless be possible to assist pupils to develop powers of concentration by a judicious arrangement of school programmes. A programme which requires the hardest work when the pupil is least capable of working vigorously makes attention unnecessarily difficult. But it is not possible to say in detail what a judicious programme is, because the question as to the relative intellectual capacities of pupils at different hours of the day has not yet been answered. To say that pupils should be required to do the hardest work when they are most capable of vigorous mental work, and the easiest, when they are least capable, does not take us a step nearer the making of a good programme unless we know when they are most, and when they are least, capable of doing mental work. Even if this were known, — and it is not, — the problem would be complicated by the fact that what one pupil finds difficult, another finds easy, and the reverse. It is an easy solution of the question to conclude that, because voluntary muscular energy undergoes certain fluctuations in the twenty hours, therefore, intellectual energy does, and without further ceremony to decide that the hours of greatest voluntary muscular energy are also those of greatest intellectual energy. But such solutions have nothing to recommend them except their simplicity. We may be sure that there is no short, high and dry cut to the goal we wish to reach. We shall learn what the ideally best programme is — in case there is such a programme — only by careful experiments conducted on a large scale, only by studying the conditions under which our pupils seem to do their work most easily, and by utilizing the results of other students in the same field.

Explanation of Inattention. — Finally, we should never permit ourselves to resort to "laziness" or "stupidity" to account for inattention as long as any other explanation is possible. I have already quoted that profound observation of Pestalozzi, "If our pupils are inattentive, we should first look to ourselves for the reason." Any teacher who earnestly tries to follow Pestalozzi's injunction will be surprised to find in how large a number of cases inattention and lack of interest on the part of his pupils are due to causes which he can remove. Sometimes a boy is inattentive because he does not see the practical value of the work he is set to doing; sometimes because he does not understand certain fundamental ideas which, being in darkness, necessarily darken the entire subject; sometimes also — sad to relate — because the teacher, by sarcastic and satirical remarks, has excited the boy's dislike. Grown people are sometimes guilty of "cutting off their noses to spite their faces," and boys very often. And when a teacher indulges in sarcasm at the expense of his pupils, they are very likely to slight their work as much as they can, even when they know they are injuring themselves, *because he wants them to do it.*[1] Get the good will of your pupils if you wish to get their attention.

[1] "Many a boy will sit and seem stolid, and all the while resent your satire with exasperation. You can not tell a sensitive boy by his look. He is not the shy, dark-eyed creature of the school tales. He may just as likely be a ruddy, high-spirited person, or a brawny athlete, or an ugly, lumpy log of a boy. And the satire may often be unjust. And, just or unjust, nineteen boys out of twenty hate it. The worst mistake of all is to use it among small boys. . . . When they are ignorant, or inattentive, or stupid, he (the teacher) begins to be sarcastic — *i.e.*, to show a far worse ignorance and stupidity than theirs." — *The Practice of Education*, p. 41.

Connect Uninteresting Work with Interesting. — Sometimes also pupils are inattentive because the facts of the subject have no natural interest for them, and have never been connected with anything that is interesting. No observer of children has failed to notice that things devoid of interest may become interesting by being connected with something that is interesting.

Revolution in Primary Teaching. — The revolution that is taking place in the primary teaching of this country is based at the outset on this fact. When children start to school, they are already interested in nature — in the bugs, butterflies, grasshoppers, birds, trees, plants and flowers with which they are familiar. They are also interested in such stories as come within the range of their comprehension — stories about animals, fairy stories, stories of adventure and the like. The business of the primary teacher is to work these interests for all they are worth — to gradually develop the interest in nature into an interest in science, and the interest in stories into an interest in literature and history, and also to connect these interests with the other work of the school in such a way that it may be done in the most economic manner possible. To this end, the reading, writing, spelling, drawing, number and language work should be connected with the study of nature and stories to as large an extent as possible. Reading for the sake of pronouncing words is a stupid task — suitable only to a parrot. But reading for the sake of acquiring information about something the pupil is already interested in is a delightful labor. Writing for the sake of imitating a copy is uninteresting. But writing for the sake of giving expression to interesting thoughts is a pleasure. What

child of seven or eight cares what six times twenty-two make? But when he and five companions each sees twenty-two red-winged grasshoppers on a given excursion, the question as to how many they have all seen is an entirely different one. What child cares to draw a mere figure, or some object taken to the school just for the sake of being drawn? But what child does not take an interest in drawing if he is asked to put on paper his ideas of a certain scene, or to represent, as he sees it, an object he is already interested in?

These illustrations might be continued indefinitely. But they will serve their purpose if they show how the interest of interesting work may be carried over to uninteresting work, and how all the work of the school may in this way be made interesting. It ought to be noted also that such work deepens the interest in, and the value of, the work that is already interesting. A child who draws a scene as it is in his mind, or an object as he sees it, cares more about the scene and the object than he did before he drew them. When he has read a story about an animal he is interested in, he is more interested in it than he was before. When he has used numbers to learn how many objects of a certain class he has seen, or what proportion one class forms to another class, the greater definiteness of his ideas is a source of pleasure. By connecting, then, the interesting work of the school with that which would otherwise be uninteresting, the uninteresting work not only becomes interesting — it adds to the value, and intensifies the interest, of the work that is already interesting.

Individuality of Pupils and Inattention. — Sometimes also boys are inattentive because we do not respect their individuality — because we set them to doing entirely

uncongenial work. It is very instructive to learn tha Darwin was counted a very dull boy, and I think it quit likely that the same opinion was held of Edison. Th trouble, of course, was not with Darwin, but with hi teachers. He had a strong bent towards the study o nature, and they wanted to teach him Latin and Greek and make him memorize books about nature. If his teacher had practiced Pestalozzi's injunction, this dull boy migh have been transformed into the most interesting anc interested student in their schools.[1]

QUESTIONS ON THE TEXT.

1. Under what circumstances is it proper to ask your pupils questions that you do not answer?

2. Mention various ways in which you can use a library to deepen the interest of your pupils.

3. In what ways does a system of discipline aid you in developing your pupils' powers of attention?

4. By what principle should the arrangement of a programme of studies be determined?

5. Mention various causes of inattention and lack of interest, and state what can be done to remove them.

6. What is meant by "respecting the individuality" of the pupil?

SUGGESTIVE QUESTIONS.

1. State the various uses of questioning pupils.

2. If a boy liked arithmetic, and disliked geography, or conversely how would you try to develop an interest in the subject to which he was indifferent?

3. Do you think there should be elective studies in high schools and, if so, to what extent?

4. Can you respect the individuality of students who are studying the same subjects?

5. What is meant by "correlation"? "Concentration"?

[1] *See* Appendix A.

LESSON XVII.

KNOWING, FEELING, AND WILLING.

IN studying our experience in order to ascertain the nature and laws of attention, we have already observed three fundamentally different classes of mental facts. We have seen that what we perceive, remember, recollect, and believe — as the result of reasoning — depends on what we attend to. But all these acts of mind (perception, memory, recollection, and reasoning) are alike forms of knowledge.

Two Kinds of Knowledge. — Perception gives us what seems to be immediate or direct knowledge of external objects — trees, houses, fences, and the like; memory, direct knowledge of past objects and events; reasoning, mediate or indirect knowledge of objects and events and laws — past, present, and future. They differ, then, in the kinds of facts of which they tell us, and the way in which they tell us about them. Perception tells us of the *present* directly; memory, of the *past* directly; reasoning, of past, present, and future *indirectly*. But they agree in being forms or kinds of knowledge. What we perceive, and what we remember, and what we learn by reasoning, we alike know, provided there has been no mistake in the processes.

Relation between Knowledge and Feeling. — But we have seen that what we perceive, remember, etc., depends on what interests us — on what gives us pleasure and pain. This interest — this pleasure and pain — is a fundamentally different fact from knowledge. Acts of knowing are indeed usually *accompanied* by pleasure or pain; but the knowing is one thing, the pleasure or pain quite another. We shall see this clearly if we consider the effect the knowledge of the same fact produces on different minds, or the same mind under different circumstances. One man reads an account of a death; it produces no effect, because the dead man was an entire stranger. Another reads it and is prostrated with grief; the dead man was his son. Or you drop your purse, and you see it lying on the ground, as you stoop to pick it up, with no feeling either of pleasure or pain. But if you see it after you have lost it and have hunted for it a long time in vain, you have a pronounced feeling of pleasure.

Different Forms of Feeling. — All forms of pleasure and pain are called feelings. Between the pleasure which comes from eating a peach and that which results from solving a difficult problem, or learning good news of a friend, or thinking of the progress of civilization — between the pain that results from a cut in the hand and that which results from the failure of a long-cherished plan or the death of a friend — there is a long distance. But the one group are all pleasures; the other, all pains. And whatever the source of the pleasure or pain, it is alike feeling.

Willing Discriminated from Knowing and Feeling. — We saw, also, in studying attention, that it often requires

hard work to take our minds from some subject that strongly attracts it. That effort is an example of *willing*. We can easily distinguish *willing* from both *knowing* and *feeling*. The boy who is invited to go skating when he has a lesson to get has a perfectly definite idea — knowledge — of what he is invited to do. That idea gives him a longing to go — feeling — but he does not decide — will — to do it. He wishes to get his lesson; the thought of leaving it unlearned gives him a form of pain. And so, between the anticipations of the pleasure the skating would give him and the pain he feels at thinking of leaving his lesson unlearned, he is undecided for some minutes — he wills neither to go nor not to go. Presently he decides — wills. He says, "I will go," and immediately makes preparations to start; or, "I will not go," and resolutely attempts to put all thought of skating out of his mind.

No matter what you do — whether you walk, sing, talk, jump, think of this or that — the act of the mind which *initiates* your activity, provided there is such an act — which is not always the case — is an act of the will.

Relation of Knowing, Feeling, and Willing to the Self. — These three classes of facts are all experiences of the same mind or self. You say, "*I* know, *I* feel, *I* will," and you say rightly. The self that knows is the self that feels and wills. Still it is convenient to have names that denote particular groups of these activities of the mind. As it saves circumlocution to have one name to denote the business of a man — farmer — and another his party ties — Republican — although the same man is both farmer and Republican, so we speak of the mind as *intellect* when we think of it as possessing and exercising the power to

know; *sensibility*, when we think of it as possessing and exercising the power to feel; *will*, when we think of it as possessing and exercising the power to will. But it is the one indivisible mind that is intellect, sensibility, and will.

We shall find upon observation that the mind does nothing but know, feel, and will. Probably you do not like to call that act of the mind by which it reaches a false conclusion an act of knowledge, and it is not as the word is popularly used. But, *as a mental fact*, what is the difference between the act of the mind by which it reaches a true conclusion and that by which it reaches one that is false? None whatever, in many cases. A child sees an old man with white whiskers, and is told that they were black when he was young. Her papa has black whiskers, and so she asks: "Papa, were your whiskers white when you were young?" Her conclusion is false, and yet her mental process is exactly like many that lead her to conclusions that are true. So also memory often misleads, and we often think we perceive what does not exist. But as mental *facts* there is no difference between memory that deceives and memory that tells the truth — between acts of perception that correspond with external objects and those that do not.

Although intellect, sensibility, and will are but different names of the one mind, as feeling and willing and knowing, there is scarcely a moment in our waking hours when we are not doing all three at the same time. Examine our minds when we will, and we shall always find ourselves knowing, and generally feeling and willing.

Opposition of Knowing, Feeling, and Willing. — Nevertheless we can not know intensely and feel or will in-

tensely at the same time; or feel intensely, and know or will intensely at the same time.

Some of the illustrations of the effects of attention will serve to illustrate this law of the mind also. When Carpenter was engaged in lecturing, he forgot his pain. Why? Because pain is a feeling; and when he was lecturing he was exercising his powers to know very vigorously. A mad man is an insane man — one whose knowing powers are disarranged. Why is it that we sometimes call an angry man mad? Because anger is a state of intense feeling, and a man in such a state often does as foolish things as though he were insane. The expression "wild with grief" has a similar significance, illustrates the same law. You have noticed also that you do not make much progress in those studies which interest you so little as to make it necessary for you to put forth a great deal of effort to keep your mind on them. Why? Because you have to will so energetically to concentrate your attention that there is little energy left for knowing.

The practical rules which are based upon this law are so evident that it is needless to enlarge upon them. You know that when your pupils are amused they do not study much, because amusement — a pleasurable feeling — is a hindrance to that concentration of mind which we call study — knowing.

The law that I have been illustrating is called the *opposition* or *antagonism* of knowing, feeling, and willing.

Interdependence of Knowing, Feeling, and Willing. — Notwithstanding this opposition, there is an interdependence of knowing, feeling, and willing. When you hurt your hand — feeling — you know that you hurt it, and you

try to relieve the pain — willing. Sometimes you have what you call the "blues" — you feel depressed without knowing why. Apart from that case, and bodily pleasures and pains, all feeling depends upon knowing. What angers you or grieves you? Something you know. When your so-called friends backbite you, it does not affect you until you know it; the misfortune that overtakes your absent friends does not trouble you until the news has reached you. The dependence of knowing on feeling I have illustrated at length in the lesson on attention. I tried to show how necessary interest is to attention, and that is only another way of stating the dependence of knowing, so far as it results from involuntary attention, upon feeling The facts of voluntary attention again illustrate the dependence of the will on feeling. I will to do this or that because of some pleasure or benefit — and that, when analyzed, will be found to consist of some form of pleasure which I hope to gain, or of some pain which I hope to avoid.

Importance of this Fact to the Teacher. — This fact of the interdependence of knowing, feeling, and willing is, as we know, of cardinal importance to the teacher. Teachers are coming to feel the importance of knowing the contents of their pupils' minds, in order that they may adapt their teaching to them. To go from the known to the unknown is to make what the pupil knows a starting-point from which to lead him to something he does not know. Plainly any attempt to explain the unknown will be a failure unless the explanation is made in terms known to the pupil. For this reason intelligent teachers are always trying to make a map of their pupils' minds, that they may learn

what points they can help their pupils to start from in making excursions into the unknown.

But there is another fact just as important which we are more likely to overlook. When you have arranged an excursion, there is something else you must do before you can be sure it will be a success; you must see to it that people have a sufficient motive to go on it. So also, when you have planned a mental excursion for your pupils, when you have found a place from which they can start, before you can be sure of their company, you must be sure that they have a sufficient motive for going with you. Dropping the figure, it is not enough for you to explain things so that your pupils *can* understand you; you must see to it that they have a motive to make the necessary exertion. What wind is to a sailing vessel, and water to a water-mill, and steam to a steam-engine, that motives — feelings of some sort — are to all intellectual activity. It is not enough to build railroads and cars and steam-engines; coal must be mined and water must be converted into steam, or the cars will never leave the depot.

Mistake of the Herbartians. — But I do not mean to intimate that *interest* is the only motive to which the teacher can appeal. Far from it. This mistake, as I deem it, is the fundamental error of the Herbartians. Following in the footsteps of their master, they undertake to construct a philosophy of education in which no place is left for the action of the will, and in which there is no need of any. As I apprehend it, education is the process by which a pupil is gradually elevated from a condition in which he is governed by the interests pertaining to sense,

to the interests pertaining to reason. But this elevation is not possible except through a constant appeal to the will. The office of the will is not to compel the mind to any line of activity in the absence of interests — that would be impossible — but of two or more interests before the mind at any moment, to choose between them in harmony with the conclusions of reason.

Which is a Good School? — The clear perception of the necessity of motives and of the enormous difference in the educational value of the motives which you may employ, will give you a new test for determining the excellence of a school. You go into a school; the order is excellent, the lessons well prepared. You say, "That's a good school." But can you be sure of that without further examination? You know indeed that good results are reached; but before you can decide as to the character of the school, you must know what means are employed to reach them — you must know what motives the teacher appeals to. Are the pupils quiet simply through fear? Then all we can say is that the school has one element of a good school — order — but that the wrong motives are relied on to get it. Do they learn their lessons to avoid punishment? Then again I say the wrong motives are appealed to. Good teaching appeals to motives that will tend to make pupils studious through life. How long will the fear of punishment influence pupils? As long as there is a teacher to inflict punishment. Indeed, as we have seen, it is not enough to make instruction interesting. Volkman well says that the precept of modern pedagogy is, "Instruct in such a way that an interest may awake and remain active for life."

Emulation. — The question as to how far emulation should be appealed to is undoubtedly difficult, but it is safe to say that it is not to be condemned altogether, as some theorists and idealists would have it. Where it is used to stimulate the idle as well as the industrious, the weak as well as the strong, it is an altogether proper and valuable motive to appeal to. In that suggestive and stimulating book, *Educational Reformers*, the author, Mr. Quick, gives an interesting and instructive illustration of some excellent work which the principle of emulation may be made to do. "Let me tell you," he says in an imaginary conversation with a friend, "of one form of stimulus which seemed to work well and was free from most of the objections you are thinking of. When I had a small school of my own, in which there were only young boys, I put up in the school-room a list of the boys' names, in alphabetical order, with blank spaces after the names. I looked over the boys' written work very carefully, and whenever I came across any written exercise evidently done with great painstaking, and, for that boy, with more than ordinary success, I marked it with a G, and I put the G in one of the spaces after that boy's name in the list hung up in the school-room. When the school collectively had a fixed number of G's, we had an extra half-holiday. The announcement of a G was therefore always hailed with delight." — P. 530, Rev. Ed.

This method tended to make the boy emulate his past self, and that was its chief excellence. It was not the merit of a boy's work, in comparison with the work of other boys, that won a G, but the merit in comparison with his own past performances. But I do not mean to

imply that it is never proper to try to get our pupils to work by inducing them to try to excel each other. Far from it. A boy who feels that he is a blockhead thinks that it is not worth while for him to try to do anything. Each pupil should be made to feel that there is some thing in which he can excel, and we should regard it as one of our most important duties to try to help him to find what that thing is. We should therefore always be on the alert to detect any signs of excellence in the work of the dull boys and girls, and be quick to commend it. I have already spoken of a boy who could not spell one word in four in a spelling lesson after hours of study. But he was excellent in arithmetic, and it was altogether proper for his teacher to praise his work in that subject as highly as it would bear.

QUESTIONS ON THE TEXT.

1. What is the difference between mediate and immediate knowledge?
2. Define intellect, sensibility, and will.
3. Define and give examples of knowing, feeling, and willing.
4. Why are erroneous reasonings classed as knowing?
5. What is meant by the opposition of knowing, feeling, and willing?
6. What is meant by their interdependence?
7. Illustrate both from your own observation and experience.
8. What is the test of a good school?
9. What is one of the most important duties of a teacher?

SUGGESTIVE QUESTIONS.

1. Show in detail the relation between the conclusions reached as to the conditions of attention and those reached in this chapter.

2. Can you bring the law of the antagonism between knowing, feeling, and willing under a wider law?

3. Mention ways in which the principle of emulation may be used to get altogether useful results.

4. Give examples of erroneous reasonings in children, and show their resemblance to correct reasonings.

LESSON XVIII.

SENSATION.

In the last lesson we picked out the threads of which the tangled web of our conscious life is composed. We learned that, no matter what subject stands in the centre of the field of consciousness — whether the toys of the child, the games of the boy, the ambitions of the young man, the absorbing occupations of maturity, or the retrospective reveries of old age — our entire mental life consists of knowing, feeling, and willing.

If my object were to discuss, even in a superficial way, these various phases of our mental life, it would be proper now to try to ascertain the strands of which these threads are composed, and show how they were twisted into their present form in our experience — to break up the complex forms of knowing, feeling, and willing, of which we are conscious, into their elements, and then trace their growth from their feeble beginnings up to the forms in which we find them.

But I have no such purpose. I intend from this point to confine myself to the intellectual or knowing side of the mental life, and to those phases of it that have most interest for us as teachers. But even here lack of space prevents me from pursuing a strictly logical course — from

trying to break up the complex forms of knowing of which we are conscious, in order to ascertain their elements.

Fortunately, however, we can be sure of some of those elements, at any rate, without any elaborate analysis. It is easy to see that we should never know anything of the objects about us were it not for their action upon the senses. We see that persons born blind have no ideas of colors — that those born deaf have no ideas of sounds; and it is evident that, if a being were born without any of the senses, he would remain in absolute ignorance of the external world, even supposing it were possible for him to have any mental life at all.

Antecedents of Sensations. — We can be sure, then, that sensations are a part, at any rate, of the elements of which our intellectual life is composed. Evidently, therefore, in discussing the intellect, the subject to begin with is sensation.

But what is a sensation? If you ever watched a hunter, at a little distance from you, in the act of firing at a bird, you doubtless noticed that you saw the smoke before you heard the report of his gun. The reason is, you say, that, as sound does not travel as fast as light, you saw the smoke before you heard the report, because the sound was outstripped in the race. But what do you mean when you say that sound travels? Surely not that the sensation traveled, because there was no sensation there. Vibrations of air alone were there — not sensations. The only immediate result of the firing of the gun was a rapid change in the position of the particles of air — not sound at all, but something which we could see if air were visible, and if the eye were quick and keen enough to follow its rapid

changes. These vibrations of air do indeed travel in such cases; and as we in imagination follow them as they radiate from the hunter as a centre, we can realize that what we are following is not sensation, but motion. Presently, by means of the mechanism of the organ of hearing, they reach the terminal fibres of the auditory nerve. Still there is only motion. The vibrating particles of air cause a change in the particles in these terminal fibres, and these in the particles next to them, and so on, until the brain centre is reached. Still we have nothing but motion. But the change in the brain centre is followed by something that is not motion — by that unique mental fact which we call a sensation of sound.

These Antecedents are Physical Facts. — You remember that a mental fact is one known or knowable by but one person directly, while a physical fact may be known by any number of persons — certain conditions being complied with. Evidently all the antecedents of the sensation of sound which we have considered are physical facts. The firing of a gun is a physical fact, since any number of people can see it at the same time. Although we can not say as much of the vibrating air, the reason is *not because of the nature of the fact, but because of defects in our senses.* If our senses were more acute, a large number of people might feel the vibrations of the air that result from the firing of a gun, and hence it is a physical fact. So also of the next antecedent, the changes in the auditory nerve produced by the vibrations of the air. Of course no one has ever seen them, because, in the first place, the nerve itself can not be seen; and in the second place, if it could, its particles are so exceedingly small that

no changes in them could be seen. But here again the reason is not because *of the nature of the fact,* but of the conditions under which it exists, and of defects in our senses. Plainly the same is true of the changes in the brain, which, like those in the auditory nerve, are physical facts. But directly after these changes in the brain — perhaps, indeed, contemporaneous with them — a fact occurs utterly unlike the series of facts that preceded it — a fact which, because of its very nature, is knowable only by the person experiencing it — and that fact is the sensation.

Suppose that the stars had been blotted out of existence, and that they began to exist again while you were looking up at the sky on a dark night, would they immediately give you a sensation of sight? Certainly not. The waves of light would travel for years before they reach your eyes, and even then there would be no sensation. The changes in the retina of your eye would have to be communicated to the optic nerve, and then to the brain centre, before there could be a sensation.

The Four Antecedents. — These examples enable us to distinguish the several antecedents that precede sensation:[1]

1. An exciting cause — something to produce a change in the ends of the nerves.

2. The action of this cause upon the nerves. Vibrating air that does not reach the auditory nerve does not tend to produce a sensation of sound.

3. That change which takes place in the nerves in consequence of the effect produced by the exciting cause upon the particles of the nerve with which it comes in contact.

[1] *See* Lindner's *Psychology*, p. 32.

What the nature of that change is no one knows, except that it is some kind of motion. You have often seen boys stand a lot of bricks in a row, so that when one was pushed down it fell against the next, and it against the one next it, until all were thrown down. Spencer compares the effect produced by a falling brick upon the rest of the row in the above case to the effect produced by the change in the particles of the end of the nerve upon the rest of them — not, of course, with the idea that there is any real resemblance in the two cases, but in order to help us imagine how a change in one part of the nerve might be communicated to the whole of it.

4. The change in the brain centre in consequence of this change in the nerve.

Which of those can be Dispensed with? — Inasmuch as it is this change that immediately precedes and *occasions* or *conditions* the sensation, we would naturally suppose that, if there were any way of producing it *without* stimulating the nerve that leads to it, the same sensation would exist that ordinarily results from stimulating the nerve. The usual method of ringing a bell is by pulling the bell-rope.[1] But as the sole utility of pulling the rope is to make the bell swing, so that its tongue may strike against its sides, and as the bell will ring just as well when from any other cause its tongue is put in motion, so we would suppose that, inasmuch as the sole function of the nerves leading to the brain in causing sensation is to cause a change in the brain centres, if in any way that change is produced without the agency of the nerve, the sensations would exist all the same.

[1] This illustration was suggested by one used by Taine.

There are many facts indicating that this supposition is true.

Blindfolded Chess-players. — It is well known that many chess-players can play with great skill with their eyes closed and their faces turned towards the wall. A man who possessed this power in a high degree gave the following account of it: "When I am in my corner, facing the wall, I see simultaneously the chess-board and all the pieces as they were in reality after the last move; and as each piece is moved I see the whole chess-board, with the new change effected. . . . It is far easier to deceive me when I watch the board than otherwise; in fact, when I am in my corner, I defy any one to mislead me as to the position of a piece without my afterwards detecting it. . . . I see the piece, the square, and the color, exactly as the workman made them — that is, I see the chess-board standing before my adversary; or, at all events, I have an exact representation of it, and not that of another board." — Taine's *Intelligence*, p. 38.

The same author narrates many other facts that point in the same direction — among others the following: "An English painter, whose rapidity of execution was marvelous, explained his mode of work in this way: 'When a sitter came, I looked at him attentively for half an hour, sketching from time to time on the canvas. I wanted no more. I put away my canvas and took another sitter. When I wished to resume my first portrait, *I took the man and sat him in the chair*, where I saw him as distinctly as if he had been before me in his own proper person — I may almost say more vividly. I looked from time to time at the imaginary figure, then worked with my pencil, then

referred to the countenance, and so on, just as I should have done had the sitter been there. *When I looked at the chair I saw the man.* Gradually I began to lose the distinction between the imaginary figure and the real person, and sometimes disputed with sitters that they had been with me the day before. At last I was sure of it, and then — all is confusion. . . . I lost my senses, and was thirty years in an asylum.'"[1]

These are a few of many cases that might be cited to show that sensations often exist when the nerve that leads to the brain is not stimulated. If we should hear a bell ring when the rope was not pulled, we should be sure that the same effect (swinging of the bell) existed as when the rope was pulled. So, likewise, when sensations exist in the manner described above, one can scarcely help believing that the bell was swinging without the rope being pulled — that there was the change in the cortical centre that occasions and conditions sensation without the stimulation of the nerve that usually causes it.

These four physical antecedents, then — the exciting cause, its action upon the nerve, change in the nerve, changes in the brain — usually precede the mental fact that we call sensation.

Examples of Sensation. — If now you were asked to give examples of sensation, would you mention the hearing of a drum and the seeing of a rose? I do not believe you would. Let us run over the series of facts that result from the beating of a drum — vibrating air, action upon the auditory nerve, change all along the auditory nerve, change in the brain — and see if we can not distinguish

[1] Taine's *Intelligence* p. 46.

between the next term, the sensation, and the hearing of the drum. If you beat a drum in the presence of a new-born babe, will he hear it? No; *he will have a sensation of sound, but he will not hear the drum.* We may have sensations of sound, and not hear anything; sensations of color, and not see anything; sensations of smell, and not smell anything; sensations of touch, and not touch anything; sensations of taste, and not taste anything.

What do you mean when you say you see an apple? You mean, among other things, that you see a round object, good to eat, and with a pleasant odor when brought near the nose. Do you *see* its odor? No; you learn the odor of things through the sense of smell. Do you *see* its taste? Again, no; you learn the taste of things through the sense of taste. Do you *see* its roundness? No; you learn the shape of things by the sense of touch and the muscular sense. How, then, are you able to know by sight alone that an object before you has a certain shape, taste, odor, etc.?

To answer that question, suppose you ask yourself what a man would know of an apple who saw one for the first time, and who had never heard of one before. He would know its shape, but he would know nothing of its odor and taste. If he tastes and smells the apple, the next time he sees an object resembling it closely in appearance, it will be likely to occur to him that it resembles it in taste and smell also — in other words, that it is an apple.

There is, you observe, a great difference between the experience of color which you have when you are looking at an apple, and the ideas of odor and taste that it suggests. *The experience of color is a present sensation;*

the ideas of odor and taste which it suggests are recollections of past sensations of taste and smell.

Definition of Sensation. — We are now ready for the definition of sensation. A sensation is that *simple* mental fact that, under normal circumstances, *directly* follows the last change in the brain in consequence of the stimulation of a sensory nerve.

Note carefully the italicized words. I say, "*directly* follows." If we bear that in mind, we shall not confuse the sensation with what it suggests. The color of an apple suggests its taste and odor; but until you actually taste and smell it, its taste and smell are not sensations, because they do not directly follow the last change in the brain resulting from the stimulation of a sensory nerve. The only thing that directly follows the last change in the brain is the sensation of color; the thought of the taste and smell of the apple are the result of the sensation, so that this change in the brain makes you think of its smell and taste *through* the sensation, or *indirectly*.

If we bear in mind the significance of the word "simple," it will save us from the same mistake. When you are seeing, hearing, touching, and tasting things, your experience is not simple. You have a sensation, and with it the recollection of sensations that it suggests.

Sensations of Sight and Seeing. — We can now see how we can have a sensation of sight without seeing anything. If you are walking along a road, the various objects within the range of your vision probably produce sensations of sight. Will you see the objects in case they do? That depends on whether they suggest the recollection of past

sensations. But, as we know, what we recollect depends on what we attend to. When, therefore, you are absorbed in thought, the chances are that you will see very few of the objects that give you sensations of sight.

QUESTIONS ON THE TEXT.

1. Summarize the results reached in the last lesson.

2. What would be the logical course if one intended to write a comprehensive treatise on the subject of Psychology, and why?

3. Show that a large part of our knowledge takes its rise in sensations.

4. Give examples of sensations from each of the five senses, discriminating carefully their physical antecedents from the sensation.

5. Which of these physical antecedents may be dispensed with without preventing the sensation from existing, and why?

6. Define sensation. Distinguish it from what it suggests.

7. How can we have sensations of sight without seeing anything?

SUGGESTIVE QUESTIONS.

1. How would you explain the sensations experienced in dreaming?

2. If an explosion were to take place on a desert, in the absence of any mind, would there be any sound?

3. Is there any ambiguity in the words "sound," "color," "taste," "smell," etc.?

4. What is the real difference between physical and mental facts?

LESSON XIX.

SENSATION.

(Continued.)

Are Colors, etc., only Mental Facts? — Let us imagine ourselves taking a walk on one of those perfect days in June that Lowell speaks of. The fresh, delicate green of the trees, the songs of birds, and the odors of a thousand flowers and blossoms, delight us. But in the midst of our enjoyment the subject of the last lesson occurs to us. We cease to enjoy; we begin to think. We ask each other if the conclusions reached in the last lesson, which seemed so true as we worked them out by gaslight, really do hold of the gorgeous panorama that lies spread out before us. Is the delicate green of the trees, the deep blue of the skies, merely a web of our own mental facts, a garment of our own making, with which, unconsciously to ourselves, we have covered up the unsightliness of nature? Are the so-called songs of birds merely echoes in our own souls of soundless motions without? In one word, are the colors and sounds and odors that seem to fill the scene before us *only* mental facts — things which, like the joys and sorrows, the hopes and fears, that make up our conscious life, *exist in our own minds, and nowhere else?*

Whatever reason may say, our first impulse is to answer with an emphatic negative. But as we follow in imagination the vibrations of air radiating from the birds in every

direction, and the waves of light from the leaves of the trees, we are forced to conclude that leaves, songs of birds, blossoms, flowers — are only exciting causes of effects which appear in our conscious life as sensations.

But the thought is unwelcome. We had supposed ourselves looking at green trees, and velvety hills, and a blue sky; our reasoning, like the wand of an envious magician, seems to strip the world of its beauty, and leave us in the presence of — we know not what. We struggle to get away from it. We feel as though an old friend, the recollection of whose voice mingles with the earliest memories of our childhood, had suddenly begun to speak to us in an unknown tongue; or rather, that the tones and language with which we had thought ourselves entirely familiar, and which had seemed to signify the most precious things in life, had suddenly shivered into meaningless noises — had become "sound and fury, signifying nothing."

Sounds and Colors as Objective Facts. — In our desire to keep the world we have known, we first betake ourselves to words. We bethink ourselves of our studies in physics, and say that, although sounds and colors are sensations, yet there are sounds and colors in nature. Undoubtedly, but of what kind? *The sounds in nature are vibrations of air; the colors, undulations of ether.* Are these what we think of when we speak of sounds and colors? If so, the terms with which we describe sounds and colors will apply to motions; when we are speaking of sounds and colors, we are speaking of motions. Is it true, then, that when we speak of sweet, melodious sounds, we mean sweet, melodious *motions?* Or when we speak of rich, gorgeous colors, do we mean rich, gorgeous motions?

A moment's thought convinces us that the things we have in mind when we use these terms are not motions at all; the colors and sounds that we think of in ordinary life — that thrust themselves upon our notice every moment — are not undulations of ether and vibrations of air — are not things that the world learned about only after centuries of investigation, but the colors and sounds of experience — sensations.

Colors and Sounds not Copies of External Facts. — Failing in this attempt, we try again. We say that, although the colors and sounds that we talk about are sensations, yet they are *copies* of facts that exist in the external world. The colors, sounds, and odors of which we have direct knowledge are sensations; but as we know how an object looks without looking at it if we see its reflection in a mirror, so the sensations of consciousness give us exact knowledge of the world beyond consciousness; they are the reflections of objects in the external world. The green that seems to be spread over the leaves is indeed spread over them, but the green that we have direct knowledge of is in our own minds. The green in our minds is the sensation, the green of experience, the copy; the green of the leaves is the outside reality — the original. This is another of the methods by which we seek to avoid accepting the conclusions of our own reasonings.

But we are at once confronted with a difficulty. I see your picture hanging on the wall. I immediately recognize it, because picture and original are both before me. But you point to another — a picture of a gentleman whom I have never seen — and ask me if I think it good. Of

course I can not say, since I have never seen the original. Before I can say whether a picture is like the original, I must have seen both. *As long as I look at a picture of which I have never seen the original, I can not say either that it is like the original, or that it has any original at all.* How, then, can we say that our sensations are like the external things which cause them?

Before we began the investigations of the last lesson, we thought that the odors, sounds, and colors of which we have direct knowledge were physical facts, external to the mind. But we learned in the last lesson that these supposed physical facts are not physical facts at all. In order to stand by our conclusion, and at the same time keep our belief in the character of the external world, we have supposed that there are parallel series of facts — mental facts of which we are conscious, and physical facts of which we are not conscious; the one a copy, the other the original. But it is now evident that we have no right to say that our sensations are copies of these external facts. We are conscious of the one set of facts; we are not conscious of the other. Until we become conscious of both — that is, until both become sensations — to say that one is a copy of the other is to say that something we know is a copy of something we do not know.

But that is not the only difficulty. You have great skill in painting. Suppose I should ask you to make me a picture of Yankee Doodle. You would tell me that my request is absurd, would you not? You would say that sounds can resemble sounds, and colors colors, and tastes tastes, but that there is such utter unlikeness between sounds and colors that we can not use language intelligently and say that any sound is like any color. Is not

the same true of mental and physical facts? In what sense can we say that a mental fact is a copy of a physical fact — a state of consciousness a copy of something that is not a state of consciousness? In no sense whatever. We must say either that the world of sounds and tastes and odors and colors is purely subjective, in the sense of consisting of our own mental facts, or else that the conclusions reached in the last lesson are wrong.

What our Sensations are Depends on our Nervous System. — But, apart from these considerations, there are many facts that make any other conclusion impossible. That conclusion is that what we call the attributes or qualities of objects — tastes, smells, sounds, colors, etc. — are sensations which these objects produce in our minds through the agency of our nervous system. How does it happen that I can make the world look green or red or blue or yellow by looking at it through green or red or blue or yellow glass? Or that I can change the apparent temperature of water by changing the temperature of the hand I put in it? Or that when I am sick nothing tastes as it does when I am well? Evidently because the qualities of objects are merely ways or modes in which the objects affect us through the agency of the nervous system; and whenever for any reason a different effect is produced upon the nervous system, the object seems to have a different quality because we have different sensations. In the case of the colored glass, the nervous system is affected differently because of a change produced by the glass upon the agent — light — that acts upon the nervous system. In the last case spoken of, the difference in taste is due to a difference in the condition of the nervous system itself,

in consequence of the disordered condition of the body. Sometimes the quality we attribute to an object — in other words, the sensations produced by it — depends upon the part of the body affected. If you take a pair of compasses, whose points are somewhat blunted, and place their points on the forearm, in the direction of the length of the arm, the two points will seem as one, unless they are more than $1\frac{1}{6}$ inches apart. But placed on the tip of the tongue, the two points are distinguished as two when they are as much as .0394 of an inch apart.

These facts make it certain that the quality of an object is not something attached to, or inherent in, the object, but merely the mode or way in which the object affects us through the nervous system. As Professor Ziehen puts it, "The constitution of the nervous system is an essential factor in determining the quality of sensation. This fact reveals the obvious error of former centuries, first refuted by Locke, though still shared by naïve thought to-day, that the objects about us themselves are colored warm, cold, etc. As external to our consciousness, we can only assume matter, vibrating with molecular motion and permeated by vibrating particles of ether."

But Changes in the Nervous System not Always Followed by Sensation. — And yet we can not say that everything which produces a change in the nervous system produces a change in the sensation. If you hold a one-pound weight in your hand when your arm is outstretched, a friend may add one-half or two-thirds of an ounce — if you do not see him — without your knowing it. Not until the added weight is about one-seventeenth the original will you perceive the difference. And you will find by experi-

ment that the same proportion holds if you make the weight in your hand heavier — *i.e.*, if it be ten pounds, it will be necessary to add nearly ten ounces before you can detect the difference.

Weber's Law. — This fact illustrates a law that governs an immense multitude of facts. Says Professor Wundt:

"Every one knows that in the stillness of night we hear things which are unperceived in the noise of day. The gentle ticking of the clock, the distant bustle of the streets, the creaking of the chairs in the room impress themselves upon the ear. And every one knows that amid the confused hubbub of the market-place, or the roar of a railway train, we may lose what our neighbor is saying to us, or even fail to hear our own voice. The stars which shine so brightly at night are invisible by day; and although we can see the moon in the day-time, she is far paler than at night. Every one who has had to do with weights knows that if to a gramme in the hand we add a second gramme, the difference is clearly noticed; but if we add it to a kilogramme, there is no knowledge of the increase.

"All these experiences are so common that we think them self-evident. Really, that is by no means the case. There can not be the least doubt that the clock ticks just as loudly by day as by night. In the clamor of the street, or amid the noise of the railway, we speak, if anything, more loudly than is usual. Moon and stars do not vary in the intensity of their light. And no one will deny that a gramme weighs the same whether it is added to one gramme or to a thousand.

"The sound of the clock, the light of the stars, the pressure of the gramme weight, — all these are sensation

stimuli, and stimuli whose intensity always remains the same. What, then, do these experiences teach us? Evidently nothing else than this: *that one and the same stimulus will be sensed as stronger or weaker, or not sensed at all, according to the circumstances under which it operates.*[1] But what kinds of change in the circumstances are there which can produce this alteration in sensation? On considering the matter closely, we discover that the change is everywhere of one kind. The tick of the clock is a weak stimulus for our auditory nerves, which we hear plainly when it is given by itself, but not when it is added to a strong stimulus of rattling wheels and all the other turmoil. The light of the stars is a stimulus for the eye; but if its stimulation is added to the strong stimulus of daylight, we do not notice it, although we sense it clearly when it is joined to the weak stimulus of twilight. The gramme weight is a stimulus for our skin which we sense when it is united to a present stimulus of equal strength, but which vanishes when it is combined with a stimulus of a thousand times its own intensity."

Such facts make it necessary for us to qualify the conclusion suggested by the facts before considered, and say that, whenever the change produced by objects in the nervous system reaches a certain degree—in other words, when the new stimulus bears a certain ratio to the preexisting stimulus—that change will be followed by a change in the sensations. As the result of an immensely large number of experiments the figures which express this ratio in the several sense departments have been stated by Professor Wundt as follows:

[1] Italics not in the original.

Light-sensation - - - -	$\frac{1}{100}$
Muscle-sensation - - - -	$\frac{1}{17}$
Pressure-sensation - - -	$\frac{1}{3}$
Sound-sensation - - - -	$\frac{1}{3}$

In other words, if we represent the intensity of light acting upon the eyes at any time by 100, in order that a new light may be perceived, it must be at least as intense as $\frac{1}{100}$ of the preceding light stimulus. If we are to hear a new sound in the midst of a pre-existing hubbub of noises, it must at least be as intense as $\frac{1}{3}$ of the pre-existing noise stimulus, and so on. This law is called Weber's law, because it was discovered by the physiologist Ernst Heinrich Weber.

Are Sensations Always Regarded as Qualities of Objects? — But an interesting question here arises: the question as to whether our sensations always wore the character they now bear — the character of seeming to be what they are not — objective qualities of objects, rather than subjective effects of these objects, produced through the nervous system; or whether in the beginning of our conscious life they appeared to be what they are — experiences of our own minds; or whether, indeed, they did not appear to be either, but were simply felt, in a vague indefinite way. A very slight observation of a new-born child will be sufficient to convince us that his sensations do not seem to him as ours do to us. As we have seen already, it is probable that in the beginning of our mental life we have no definite sensations. Little by little, a child's sensations become definite; little by little, they are built up into the qualities and attributes of the external world. How is it done? That is a difficult question, the

answer to which is the solution of the problem of perception. But before we can attempt to consider it, we must study two laws which play an important part in the matter — the law of habit and the law of the association of ideas.

QUESTIONS ON THE TEXT.

1. Do you find yourself unwilling to believe that colors, sounds, etc., are sensations?
2. What are the sounds and colors spoken of by physics?
3. Show that our sensations are not copies of physical facts.
4. Mention other facts showing that what the world appears to us to be depends on changes in the nervous system.
5. Is every change in the nervous system followed by a change in the sensation?
6. What is Weber's law? State the evidence, so far as you know it, on which it is based.
7. Do a child's sensations seem to be qualities of objects?
8. What is the problem of perception?

LESSON XX.

THE LAW OF HABIT.

We have already had occasion to notice some of the phenomena of habit. The child, at first unable to walk, then only a step or two and with great difficulty; the cyclist, at first obliged to give his entire attention to his wheel; the learner on the piano slowly spelling out the notes—are cases in point. Child, cyclist, pianist, all acquire the skill which finally seems a sort of second nature through habit.

Reid on Habit. — Reid says: "As without instinct the infant could not live to become a man, so without habit man would remain an infant through life, and would be as helpless, as unhandy, as speechless, and as much a child in understanding at three-score as at three."

Strong as this statement seems, it is probably an understatement of the truth. Without habit, we should rather say, a man would be as helpless, as speechless, as unhandy at three-score as at birth. Habit is the architect that builds the feeble rudimentary powers of the child into the strong, developed powers of the full-grown man. If a child's vague, purposeless movements give place to definite movements performed for definite purposes, if his sensations become more definite, if his perceptions become

clearer, if his memory becomes more accurate, if he reasons more and more correctly and logically, it is because of habit.

Law of Habit. — What is the law of habit? It is that every time we perform any action, mental or physical, we have more proneness to, and greater facility for, the performance of that action under similar circumstances than we had before. All the curious gestures, ways of holding the hands, attitudes, modes of speech, and the like that characterize the various people we know, are due to the law of habit.

Does Growth Depend on Habit? — Sully says that the "formation of a disposition to think, feel, etc., in the same way as before, underlies what we call habit," and that "in its most comprehensive sense" it means "a fixed tendency to think, feel, or act in a particular way under special circumstances." He thinks that "habit refers to the fixing of mental operations in particular directions," and hence, that it does not constitute the sole ingredient of intellectual development. He thinks that it is "the element of persistence, of custom, the *conservative tendency*," and that since "growth implies flexibility, modifiability, susceptibility to new impressions, the *progressive* tendency," "habit is in a manner opposed to growth."

Is he right? Is it true that habit is in a manner opposed to growth? I do not think so.

Habits and the Law of Habit. — His opinion grows out of a failure to distinguish between *habits* and the law of *habit*. Many particular habits undoubtedly are bad.

A man may form the habit of reasoning on insufficient data, or of observing carelessly; he may form the habit of forgetting that he is finite, and so liable to mistakes; that all that he has thought on any subject may be wrong because he may have overlooked some fact already known, or because some unknown fact may contradict all his conclusions. He may form the habit of laying great emphasis on consistency, that "hobgoblin of little minds," and so go through the world with his head turned over his shoulder determining what he will believe to-day by what he believed yesterday. He may form the habit of deciding what he will believe by some other principle than reason. As the Chinese go to Confucius, and Catholics to the Pope, to tell them what to believe, so he may go to his father, or some politician, or the convention of his party, or his newspaper to tell him what to believe. These habits are unfavorable to growth, and are therefore bad habits; but is there anything in the nature of the law of habit to make it necessary for us to form bad habits? Are there not some open-minded, cautious, independent reasoners? What is an open-minded reasoner? He is one who has formed the habit of being constantly on the alert to find new evidence; one who knows and feels that when men have done their utmost to avoid error, they can not be so sure they are right as to shut their minds to all further considerations; one who has so habituated himself to considering the supreme difficulty of arriving at the truth in any matter of complexity that he is rather inclined to wonder that men are ever right, than to assume that they can consider themselves as undoubtedly right whenever they reach a conclusion. What is a cautious reasoner? He is one who has so accustomed himself to the thought of the infiniteness of the universe,

that *what is known* in comparison with *what is*, seems to him like a drop of water in comparison with the Pacific Ocean, and hence he habitually realizes the absolute necessity of collecting as many facts as possible bearing on any matter under consideration before he reaches a conclusion. What is an independent reasoner? He is one who has no Confucius, one who does not go to his father, or to any influential politician, or to his party convention, or his newspaper to find out what to believe — *one who does not use his reason to find arguments to defend conclusions furnished him from some external source, but uses it to learn what is true.*

Habits Depend on what we Do. — Such habits, be it noted, are as much the result of the law of habit as are the habits that are opposed to growth. *The law of habit tends to make us whatever we want to be enough to express our desires in action.* Is there any antagonism between such habits and growth? Can we say that such habits represent the *conservative* tendency? I can not think so. When teachers come to realize that this characteristic of open-mindedness and caution and independence is not only one of the rarest among educated men, but one of the most important; when they realize that no matter how able and brilliant a man may seem, he is a fossil, a thing of arrested development, precisely to the extent to which he is lacking in this characteristic; when they have become profoundly convinced of the fact that the supreme difference between the most progressive civilizations in the world and such nations as the Chinese, is that the people of the former have formed the habit, to some extent, of going to reason to tell them what to believe, and the

people of the latter have formed the habit of accepting their beliefs on authority, they will not only be sure that there is no antagonism between growth and habit, but that an important part of their work consists in rooting up the habits which would confine the thoughts of their pupils within the thoughts of the past, by helping them to form habits of open-minded, cautious, independent reasoning.

Influence of Example in Forming Habits of Reasoning. — We can not help our pupils form that habit until we have formed it for ourselves. It is the *example* of open-minded, cautious, independent reasoning; it is the fervid appeal to students not to imitate a flock of sheep, who jump when their leader has jumped, and do not jump when he has not jumped, without regard to the considerations that influenced him — a fervor which can emanate only from one who so believes in, as to practice that kind of reasoning; it is the keen and merciless exposure of the utter irrationality of unreasonableness by one whose whole being is saturated with the conviction — that gives students the strongest impulse to the formation of the habit of reasoning in this way.

Example of Socrates. — Moreover, we should ourselves love the truth more than we love our own opinions if we wish to make our pupils open-minded reasoners. Socrates, arguing the question as to the immortality of the soul an hour before he was to suffer death for crimes that he had not committed, gives us a beautiful example of this. Two of his companions have stated an objection which has inflicted a wound, as he says, on his argument. He admits

that he has the temper of a partisan, rather than that of a philosopher, since he wishes to convince himself of the immortality of the soul. But even under such circumstances, his loyalty to truth shines out like a star of the first magnitude. "This is the state of mind," he said, ". . . in which I approach the argument. And I would ask you to be thinking of the truth and not of Socrates: agree with me if I seem to you to be speaking the truth; or if not, withstand me might and main, that I may not deceive you as well as myself in my enthusiasm and, like the bee, leave my sting in you before I die."

Basis of Habit. — Is the basis of habit physical or mental? In other words, is the law of habit due to the fact that our bodies, and especially our nervous systems, are constituted as they are, or is it due to the character of our minds? Is the law of habit due to the fact that whatever we do leaves an effect upon some part of the body which makes it easier to do the same thing under similar circumstances, or is it an ultimate law of the mind as such, about which no more can be said than that it is a fact?

Stupidity of some Actions Performed through Habit. — Numerous facts indicate that the former is the case. The utter stupidity of many actions performed through habit make it hard to believe that the mind has anything to do with them. I have heard of a student who picked up a coal-scuttle on a cold winter-day, took it to a pump, and filled it with water, and then emptied it into his stove. If the basis of habit is physical, we can understand such cases. In that case we are to regard the body as tending

to become under the influence of the mind, a vast complex of machines fitted to perform certain actions when the conditions are fulfilled, whether the performance of the action leads to an intelligent result or not. In the language of Professor Ladd, we should in that case regard habitual actions as "done for the psychic life by a physical automaton rather than *in* or *by* the psychic life." We should say that "when this automaton once becomes trained under conscious physical influences, it performs many highly complicated and purposeful motor changes, without troubling the flow of consciousness to pay attention to them." But as those purposeful actions are performed because certain physical conditions are fulfilled, so when these physical conditions are fulfilled, these actions will be performed whether they are purposeful or not, — as a gun will fire with equal readiness whether it is intelligently directed at a dangerous enemy, or whether it is aimed by a lunatic at a man whose life is essential to the welfare of the State. Assuming, then, that the law of habit has a physical basis, we have an easy explanation of the stupidity of many mechanical actions. The physical machine goes off, so to speak, whenever the trigger is pulled, whether the result is purposeful or not. But upon the supposition that the law of habit has its basis in the mind, we are confronted with the remarkable fact that actions imputed to intelligence are often wholly destitute of all the qualities that are characteristic of intelligence.

Ethical and Pedagogical Inferences. — Professor James has stated the ethical and pedagogical inferences from the law of habit so much better than any one else, that I shall quote him at length.

Importance of a Strong Initiative. — "In Professor Bain's chapter on 'The Moral Habits' there are some admirable practical remarks laid down. Two great maxims emerge from his treatment. The first is that in the acquisition of a new habit, or the leaving off of an old one, we must take care to *launch ourselves with as strong and decided an initiative as possible.* Accumulate all the possible circumstances which shall re-enforce the right motives; put yourself assiduously in conditions that encourage the new way; make engagements incompatible with the old; take a public pledge, if the case allows; in short, envelop your resolution with every aid you know. This will give your new beginning such a momentum that the temptation to break down will not occur as soon as it otherwise might; and every day during which a breakdown is postponed adds to the chances of its not occurring at all.

Never Suffer an Exception to Occur. — "The second maxim is: *Never suffer an exception to occur till the new habit is securely rooted in your life.* Each lapse is like the letting fall of a ball of string which one is carefully winding up; a single slip undoes more than a great many turns will wind again. *Continuity* of training is the great means of making the nervous system act infallibly right. As Professor Bain says:

"'The peculiarity of the moral habits, contradistinguishing them from the intellectual acquisitions, is the presence of two hostile powers, one to be gradually raised into the ascendant over the other. It is necessary, above all things, in such a situation, never to lose a battle. Every gain on the wrong side undoes the effect of many con-

quests on the right. The essential precaution, therefore, is so to regulate the two opposing powers that the one may have a series of uninterrupted successes, until repetition has fortified it to such a degree as to enable it to cope with the opposition, under any circumstances. This is the theoretically best career of mental progress.'

Act on First Opportunity. — "A third maxim may be added to the preceding pair: *Seize the very first possible opportunity to act on every resolution you make, and on every emotional prompting you may experience in the direction of the habits you aspire to gain.* It is not in the moment of their forming, but in the moment of their producing *motor effects*, that resolves and aspirations communicate the new 'set' to the brain. As the author last quoted remarks:

"'The actual presence of the practical opportunity alone furnishes the fulcrum upon which the lever can rest, by means of which the moral will may multiply its strength, and raise itself aloft. He who has no solid ground to press against will never get beyond the stage of empty gesture-making.'

Actions versus Sentiments and Maxims.—"No matter how full a reservoir of *maxims* one may possess, and no matter how good one's *sentiments* may be, if one have not taken advantage of every concrete opportunity to *act*, one's character may remain entirely unaffected for the better. With mere good intentions, hell is proverbially paved. And this is an obvious consequence of the principles we have laid down. 'A character,' as J. S. Mill says, 'is a completely fashioned will'; and a will, in the sense in which

he means it, is an aggregate of tendencies to act in a firm and prompt and definite way upon all the principal emergencies of life. A tendency to act only becomes effectively ingrained in us in proportion to the uninterrupted frequency with which the actions actually occur, and the brain 'grows' to their use. Every time a resolve or a fine glow of feeling evaporates without bearing practical fruit is worse than a chance lost; it works so as positively to hinder future resolutions and emotions from taking the normal path of discharge. There is no more contemptible type of human character than that of the nerveless sentimentalist and dreamer, who spends his life in a weltering sea of sensibility and emotion, but who never does a manly concrete deed. Rousseau, inflaming all the mothers of France, by his eloquence, to follow Nature and nurse their babies themselves, while he sends his own children to the foundling hospital, is the classical example of what I mean. But every one of us in his measure, whenever, after glowing for an abstractly formulated Good, he practically ignores some actual case, among the squalid 'other particulars' of which that same Good lurks disguised, treads straight on Rousseau's path. All Goods are disguised by the vulgarity of their concomitants, in this work-a-day world; but woe to him who can only recognize them when he thinks them in their pure and abstract form! The habit of excessive novel-reading and theatre-going will produce true monsters in this line. The weeping of a Russian lady over the fictitious personages in the play, while her coachman is freezing to death on his seat outside, is the sort of thing that everywhere happens on a less glaring scale. Even the habit of excessive indulgence in music, for those who are neither performers themselves nor musically gifted enough

to take it in a purely intellectual way, has probably a relaxing effect upon the character. One becomes filled with emotions which habitually pass without prompting to any deed, and so the inertly sentimental condition is kept up. The remedy would be, never to suffer one's self to have an emotion at a concert, without expressing it afterward in *some* active way. Let the expression be the least thing in the world — speaking genially to one's aunt, or giving up one's seat in a horse-car, if nothing more heroic offers — but let it not fail to take place.

"These latter cases make us aware that it is not simply *particular lines* of discharge, but also *general forms* of discharge, that seem to be grooved out by habit in the brain. Just as, if we let our emotions evaporate, they get into a way of evaporating; so there is reason to suppose that if we often flinch from making an effort, before we know it the effort-making capacity will be gone; and that, if we suffer the wandering of our attention, presently it will wander all the time. Attention and effort are, as we shall see later, but two names for the same psychic fact. To what brain-processes they correspond we do not know. The strongest reason for believing that they do depend on brain-processes at all, and are not pure acts of the spirit, is just this fact, that they seem in some degree subject to the law of habit, which is a material law.

Cultivate Faculty of Effort. — "As a final practical maxim, relative to these habits of the will, we may, then, offer something like this: *Keep the faculty of effort alive in you by a little gratuitous exercise every day.* That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason

than that you would rather not do it, so that when the hour of dire need draws nigh, it may find you not unnerved and untrained to stand the test. Asceticism of this sort is like the insurance which a man pays on his house and goods. The tax does him no good at the time, and possibly may never bring him a return. But if the fire *does* come, his having paid it will be his salvation from ruin. So with the man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things. He will stand like a tower when everything rocks around him, and when his softer fellow-mortals are winnowed like chaff in the blast.

Physiological Study of Mental Conditions an Ally of Ethics. — "The physiological study of mental conditions is thus the most powerful ally of hortatory ethics. The hell to be endured hereafter, of which theology tells, is no worse than the hell we make for ourselves in this world by habitually fashioning our characters in the wrong way. Could the young but realize how soon they will become mere walking bundles of habit, they would give more heed to their conduct while in the plastic state. We are spinning our own fates, good or evil, and never to be undone. Every smallest stroke of virtue or of vice leaves its never so little scar. The drunken Rip Van Winkle, in Jefferson's play, excuses himself for every fresh dereliction by saying: 'I won't count this time!' Well! he may not count it, and a kind Heaven may not count it; but it is being counted none the less. Down among his nerve cells and fibres the molecules are counting it, registering and storing it up to be used against him when the next temptation comes. Nothing we ever do is, in strict scientific literal-

ness, wiped out. Of course, this has its good side as well as its bad one. As we become permanent drunkards by so many separate drinks, so we become saints in the moral, and authorities and experts in the practical and scientific spheres, by so many separate acts and hours of work. Let no youth have any anxiety about the upshot of his education, whatever the line of it may be. If he keep faithfully busy each hour of the working-day, he may safely leave the final result to itself. He can with perfect certainty count on waking up some fine morning, to find himself one of the competent ones of his generation, in whatever pursuit he may have singled out. Silently, between all the details of his business, the *power of judging* in all that class of matter will have built itself up within him as a possession that will never pass away. Young people should know this truth in advance. The ignorance of it has probably engendered more discouragement and faint-heartedness in youths embarking on arduous careers than all other causes put together."

QUESTIONS ON THE TEXT.

1. What is the law of habit?
2. How does Sully define it?
3. Is he right?
4. Distinguish between the law of habit, and habits.
5. What can we do to make our pupils cautious and independent reasoners?
6. Is the basis of habit physical or mental?
7. Enumerate the maxims which Professor James infers from the law of habit.

LESSON XXI.

ASSOCIATION OF IDEAS.

Association of Ideas Illustrated. — If you think about anything, no matter what, you are sure to find yourself thinking, the moment after, of something connected with it. Think about the last school you attended, and you may think of a schoolmate, or of some of the books you studied, or of some of the games you played. Think of Napoleon, and you may think of a friend who lent you a book about him, or of some of his battles, or of Alexander or Cæsar. This fact, that thinking of anything tends to make us think of something else connected with it, is called the association of ideas.

Different Kinds. — If you watch the course of your thoughts for an hour, you will find that there are very different kinds of connection between the ideas recalled and the experiences that recall them. If you think of a hill, it may make you think of a walk you took there last night, or of one like it near your own home. The thought of the hill makes you think of the walk you took there, because when you were taking the walk you thought of the hill. In other words, the thought of the hill and the thought of the walk *were in your mind at the same time.* The thought of the hill makes you think of one like it near

your home, not because you have ever seen or thought of them both at the same time before, but because they are *like each other.*

Association of the first kind — association by contiguity, as it is generally termed — is sometimes called mechanical association; and I think it will be useful for us to remember both names, and the reasons for them. It is called association by contiguity because contiguity means nearness, and the things associated by contiguity were thought of at or about the same time. It is called mechanical association to contrast it with another kind of association called logical or rational. When the thought of the hill makes you think of one like it near your own home, it is because there is an *inner* relation — similarity — and not a mere external, mechanical relation between them. But if the first time a child sees a Chinaman and a steam-engine he sees them both together, the next time he sees one of them he will be likely to think of the other, not because they have an inner connection, but because they were seen at the same time. Hence this kind of association is called mechanical, because the things associated have only an external or mechanical connection; it is called association by contiguity because they were thought of at or about the same time.

Mechanical Association. — Evidently the connecting link in the case of things mechanically associated is time; but we must be careful to remember that the time which forms this connecting link is *not the time in which events happen, but the time in which we think of them.* The Declaration of Independence makes you think of the Fourth of July, not because it was made on that day, but

because the thought of the two has been in your mind at the same time.

Logical Association. — But in order that we may associate things rationally or logically, we must be able to perceive some *inner relation* between them. Things as unrelated as it is possible for things to be in this world may be brought side by side in space; and if so, we may see them at the same time, and so associate them mechanically. But in order to associate them logically we must be able to apprehend an inner relation between them — a relation not depending on accident or chance, but growing out of their very nature.

Of these inner relations, besides likeness, the relations of cause and effect, of instrument and use, of means and end, of premise and conclusion, of law and example, at once occur to us; and a careful study of them will enable us to realize the contrast between the *innerness* of logical relations and the *outerness* of mechanical relations. Two peaches can not but be like each other — they would not be peaches if they were not; a good school must be a useful agency in developing the minds of its pupils; fire must throw out heat as long as the present constitution of the world remains the same. In all these cases it is evident that the relation is not external or accidental or casual, but *inner* — growing out of the very nature of the things themselves.

Importance of the Distinction between Mechanical and Logical Association. — The distinction between mechanical and rational association is of the first importance in Psychology. Many psychologists hold a theory of

the mind which would do away with all rational association —which would make what seems to be rational association nothing but mechanical association. I can not but think that they are wrong. But we need to note that many actions that seem to be due to rational associations may be, and probably are, due to mechanical associations. When a dog goes out into the field, about sunset, and drives a herd of cows home, it seems to be a case of rational association. It seems as though he had perceived the relation between milking time and driving the cows into the pound in order to be milked. We are inclined to suppose that his thoughts took some such form as the following: "It is about milking time, so I will bring the cows home in order that they may be milked." But more careful consideration will make it clear that we need not suppose any such thing. We may suppose that the various circumstances characteristic of approaching sunset caused the idea of going after the cows to arise in his mind *by purely mechanical associations.* In other words, the perception of approaching sunset was followed in his mind by the thought of going after the cows *without any perception of the relation between them*, and the thought of going after the cows by the sensations of motion resulting from carrying his idea into effect, *without any perception of the relation between bringing them home and milking time. What seems to be a case of reasoning may be, and probably is, nothing but a series of mechanical associations.*

Why Ideas Rationally Associated Recall Each Other. — But why does a cause make us think of its effect; a means, of the end it is adapted to reach; an instrument, of its use; a premise, of a conclusion? *Partly* because

the thought of the two has been in the mind at the same time. But that this is not a complete answer is evident from the fact that, of the various thoughts in our minds at the same time, those are most likely to recall each other that have some inner relation. Of the things we think of during the course of a day, most of them pass away beyond the possibility of recall, because they are meaningless, isolated, disconnected — because the only connection between them is the time in which we think of them. Evidently, therefore, there is something in the fact that thoughts have some logical connection, which tends to make them recall each other. Let us see if we can learn what it is.

Because Apprehension of Relations is a Source of Pleasure. — We know that anything upon which we fix our minds for a considerable length of time — anything that interests us, anything that for any reason we attend to — is more likely to be recalled than the things which merely flit across our minds like shadows across a landscape. But the things that have an inner relation are precisely those we are sure to attend to, provided we apprehend the relation. We are sure to attend to them in the first place, because the apprehension of relations is a source of keen intellectual pleasure. We have seen already how it delights the mind to have a lot of disconnected, straggling facts marshaled into compact array, each one dropping into its proper place in relation to the rest. It increases our sense of power. To carry a load of facts by mechanical association has been aptly compared to the carrying of food "in a bundle strapped upon the back"; the carrying of the same facts by rational associa-

tion, to the carrying of the same food "eaten, digested, and wrought over into the bones and muscles which hold the body firm and solid." Now, whatever adds to our sense of power — whatever gives us pleasure — is sure to be attended to; and the greater the feeling of power, and the keener the pleasure it gives us, the greater the amount of attention we give it.

Also of Practical Importance. — But apart from this the apprehension of inner relations is of the greatest practical interest to us. The ability to go from effects to causes and from causes to effects, from laws to examples and from facts to laws, from premises to conclusions and from particulars to premises, to adapt means to their ends and instruments to their uses, not only marks the great difference between the mind of a civilized man and that of a savage, but results in the almost infinitely greater command that the former has over the resources of nature. To have special ability in the apprehension of the inner relations of things is to have power not only as an intellectual possession, but in the sense of ability to accomplish the things that men wish to accomplish in life. This is another reason why we are sure to attend to things when we perceive their inner relations; whether they have a natural interest for us or not, they have an acquired interest, because we know we can use such knowledge in reaching desired results.

Influence of Habit. — These two causes bring a third one into operation. Because of these two causes a large part of our intellectual life consists in the search for inner relations. Study, as we first conceived it, consisted in the

exercise of mechanical association. But both as students and as men and women of the world we have come to have an entirely different notion of it. We have come to see that study — thought — consists in the attempt to apprehend the inner relations of things and to see that progress — no matter in what direction — depends upon the success of our efforts. In this way we form the habit of noticing the inner relations of things, even when we do not see how the knowledge is likely to be of practical value. For these three reasons, then, (1) because of the pleasure the mind derives from the perception of inner relations; (2) because of the practical interest such relations have for us; and (3) because of habit — we are more likely to attend to things between which the mind perceives them than to disconnected facts. The reason, therefore, why we are more likely to recall things associated logically than we are to recall any other facts experienced at the same time is because the former are more closely attended to.

We are left, then, with two great laws of association: The law of association by contiguity that *thoughts or ideas or experiences that have been in the mind at or about the same time tend to recall each other;* and the law of association by similarity that *similar thoughts or ideas or experiences tend to recall each other.*

Spontaneous Reproduction. — Many psychologists contend that the explanation of the appearance of every idea in the mind is found in the law of association; that, no matter what we find ourselves thinking of, the reason why we are thinking of it is that it was "suggested" by some other idea or experience. Others — among them Professor Ladd — contend that there is such a thing as spontaneous

reproduction, such a thing as the appearance of ideas not suggested by other ideas but due to the fact that "every vivid, life-like, and frequently repeated impression tends to reproduce itself again and again."

It seems to me that the advocates of spontaneous reproduction are right. Who has not found himself haunted hour after hour and sometimes day after day by some pleasing melody. "I can not get it out of my mind," we say at such times. And the man is fortunate who has not found himself haunted by an entirely different experience, a sense of calamity and trouble from which he can not escape, which follows him like his shadow. The fact certainly seems to be, not that everything suggests these experiences, but rather "that we can not find percepts or ideas impressive enough to suggest any other than the dominant idea." At such times men sometimes try — and how often in vain! — to put their minds on a book in order to get away from the unwelcome thoughts, as a sufferer from toothache seeks by similar methods to forget his agonizing pain. And as a man suffering from toothache often finds it impossible to forget it, because its cause is found in existing nervous conditions, so we often find it impossible to get away from the troubles that oppress us, because their spontaneous tendency to occupy the mind is more than a match for the ideas that we are able to bring before us by the association of ideas.

Can Association by Similarity be Explained by Association by Contiguity? — Some psychologists attempt to explain *association by similarity* by *assceiation by contiguity*. The following quotation from Thomas Brown will explain their position: "A ruff like that worn

by Queen Elizabeth brings before us the sovereign herself, though the person who wears the ruff may have no other circumstance of resemblance; . . . it is necessary only that a part of the complexity (the Queen) should be recalled — as the ruff — to bring back all the other parts, by the mere principle of contiguity. . . . In like manner we might be able to reduce every case of suggestion" — association — "from direct resemblance to the influence of mere contiguity."

We might state his illustration this way: ruff + *a b c d* (*a b c d* meaning a person wearing it) recalls ruff + *e f g h* (*e f g h* meaning Elizabeth), because the thought of Elizabeth and the ruff were in our minds at the same time.

Can Association by Contiguity be Explained by Association by Similarity? — Others explain *association by contiguity* by *association by similarity*. The same example can be used to illustrate their position. They would say, granted that ruff + *a b c d* recalls ruff + *e f g h* because there is a ruff in both cases, yet the ruff that Elizabeth wore is not the one we see now. Let R stand for the ruff we see now and R' for the ruff worn by Elizabeth, and we can symbolize the facts in this form: $R\ a\ b\ c\ d$ recalls $R' e f g h$. Stated in this form, they say, it is evident that $R\ a\ b\ c\ d$ recalls $R\ e f g h$ because of the likeness between R and R'.

I think we shall agree that the latter have only explained why R recalls R'. To account for the fact that we think of *e f g h* also, I think we must say R' recalls *e f g h* because R' and *e f g h* were thought of at the same time. In other words, *association by contiguity* is an *ultimate* mental law, ultimate because it can not be analyzed into anything simpler.

Fundamental Law of Association. — We have, then, as our fundamental law of association the following: *One thought, idea, or experience tends to recall similar thoughts, ideas, or experiences, and all other thoughts, ideas, or experiences that were in the mind at the same time.* Remembering the influence exerted upon association by the apprehension of inner relations, we see that the above law requires qualification: *One thought, idea, or experience tends to recall similar thoughts, ideas, or experiences, and all other thoughts, ideas, or experiences that were in the mind at the same time, the latter with a force proportionate to the number and clearness of the inner relations apprehended between them and the attention we bestow upon them.*

Explanation of the Association of Ideas. — But, after all, what does this so-called law amount to? If we examine it closely, we shall see that all it does is *to describe the facts.* When we are thinking of one thing, we are likely the next moment to find ourselves thinking of some similar thing, or of something which we have thought of before when we were thinking of that thing. That is what the law states, but as to *why* it is so, it is as silent as the sphynx. Can we assign a cause for the association of ideas? Can we tell why it is that the thought of one thing tends to recall the thought of some other thing?

Physical Basis. — There seems good reason for supposing that the association of ideas is due to the law of habit in the nervous system. The similarity between the phenomena of habit and association by contiguity is evident at a glance. Now, if we suppose — as we must —

that there is a physical basis for these thoughts or ideas associated by contiguity, we shall see that there is reason for supposing that one thought recalling another thought that has been in the mind before in connection with it, is due to the fact that one brain change tends to excite another brain change which has been active before in connection with it. We have seen that the various parts of the cortex are connected with each other by fibres called association fibres. It is these fibres which are supposed to be the conductors along which the nervous current passes from one part of the cortex to another which has been in a state of excitement at the same time.

Further, if we suppose that similar ideas have their physical basis in the same part of the brain — as the evidence requires us to do at least to a certain extent, since it has already been proved, as we have seen, that sensations of sight are localized in a particular part of the cortex — we shall be able to form a crude sort of notion of how it happens that thinking of one thing tends to make us think of a similar thing. The thought of the one thing is due to the excitement of some of the same cortical cells whose excitation caused the thought of the preceding thing, and therefore the excitation of the cells corresponding to the thought of one thing causes, by the law of habit, the excitation of the cells corresponding to the thought of the other thing.

Limitations of such Explanations. — But if we accept this crude explanation as entirely complete and satisfactory — and it is far from it — there are some facts which neither it nor any other physical explanation has ever made clear. Granted, for example, that the excitation of similar parts

of the brain causes similar thoughts to arise in the mind, how do we know that those thoughts are similar? The *existence* of similar thoughts is one thing; the *consciousness of their similarity* is a radically different thing.

But the thorough discussion of these questions is too difficult for such elementary study as ours. If you wish to see the best *explanation* that has ever been given of the association of ideas, read Professor James's *Psychology*, and if you wish to see a forcible statement of the limitations of all such explanations, read Professor Ladd's *Physiological Psychology*.

QUESTIONS ON THE TEXT.

1. Illustrate what is meant by *association of ideas* from your own experience.
2. Illustrate from your own experience the different kinds of association.
3. What is the difference between logical association and association by contiguity?
4. Explain the different names for association by contiguity.
5. Explain the various reasons why things logically associated tend to recall each other.
6. State the two laws of association, and explain the attempts to derive one from the other.
7. State verbatim the formula in which the two may be stated.

SUGGESTIVE QUESTIONS.

1. Explain *ideas* in the phrase, *association of ideas*.
2. A child seeing a snake licking out its tongue, said it was making faces at him. What kind of association was that?
3. I read to-day the following sentence from Goethe: "Take care of the beautiful, and the useful will take care of itself," and at once thought of Spencer's essay on "What Knowledge is of Most Worth." Why?
4. What kind of associations do children first form?

LESSON XXII.

PERCEPTION.

Knowledge Begins with Sensations. — We have seen already that all knowledge takes its rise in sensation. The mental history of every human being begins with its first sensation. Before the first sensation, the only difference between a human being and any other growing thing — a tree, for instance — so far as mind is concerned, consists in the fact that the former possesses the potentiality of mind. This potentiality first begins to become actuality when the human being experiences its first sensations.

Sensations Exist before they are Known. — But although knowledge takes its rise in sensation, it by no means follows that the first experience of sensations constitutes the beginning of knowledge. If we consider what knowledge is, we shall see that, in the nature of the case, the mind must have sensations before it knows it has them. I do not mean merely that a fact must exist in order to be known. That, of course, is true of sensations, but more than that is true. Sensations not only must exist in order to be known, but they may exist — and often do — for a considerable period before they are known; and I think, if we realize what knowledge is, we shall see that in the nature of the case this must be so.

What is Knowledge? — What is it to know a thing? It is to put it into a class, is it not? A child sees a menagerie, and fixes his eyes on an animal unknown to him. In what does his ignorance of it consist? In his inability to class it. He looks at it steadily, and suddenly shouts, "Oh, it is an elephant!" What has happened? How is it that ignorance has given place to knowledge? He has suddenly noticed the resemblance between this unknown object and certain pictures he has seen in his reading-book; he has put it into a class, and when he has classed it he knows it.

This putting things into classes constitutes the essence of *all* knowing. Some kinds of knowledge we call science — orderly, systematic knowledge — knowledge of laws and causes and principles; other kinds we call unscientific, because in these cases our knowledge is unsystematic and disconnected. But whether we know scientifically or unscientifically, in order to know a thing we must classify it, and in the act of classification consists our knowledge of it. Before Newton, no one understood the motions of the moon. He helped us to understand them — explained them, as we say — by helping us to classify them. But in what does our understanding of them consist? Merely in that we have put them into a class along with many familiar facts. As the child felt that he knew the animal in the menagerie when he noticed its resemblance to the pictures he had seen in his reading book, so we feel that we understand the motions of the heavenly bodies when we have put them into the same class with familiar facts, such as the falling of a leaf or the dropping of a stone. As to the *cause* of these motions — as to the nature of the force upon which they depend — we are as ignorant to-day

as were those old Chaldæans who used to stand on the plains of Chaldæa gazing up into the sky with that wondering curiosity which has been so well called the mother of knowledge. We call it gravity, and think we know all about it, because when the mind sees the resemblance between a strange fact and familiar facts the sense of mystery is gone. Suppose we should ask what is the cause of death, would you think it a sufficient answer to say that all things die? That is a precise illustration of our explanation of the motions of the heavenly bodies. What makes the heavenly bodies move? The law of gravitation, or the force of gravity, is answered. But that is only another way of saying that all bodies move.

If, then, all knowing is merely classifying — if a thing unknown is merely a thing unclassified — the first sensations must be unknown. A boy can not put his first piece of money in his purse with the rest of his money, because he has no other money. So the first sensation can not be classed with preceding sensations, because, since it is the first, it has no predecessors. Knowledge, then, takes its rise in sensations, not in the sense that the first experience of sensations constitutes the beginning of knowledge, but in the sense that *sensations constitute the first material upon which the mind's powers of knowing are exerted.*

Characteristics of the First Sensations. — Observations of new-born children will not only confirm this reasoning, but will lead us to suppose that for some little period in the beginning of a child's life there is no knowledge of sensations. Knowledge begins with attention. Not till the child attends to his sensations can he be said to know them in any proper sense of the word. But what

shall we say of these sensations before they are known? What characteristics do they have? *None whatever.* Our sensations are *this* rather than *that* — sensations of color rather than sensations of sound — *through being known.* Before they are known — before they are individualized through being attended to and classed — we can call them sensations of sound, for example, only in the sense that they are occasioned by the stimulation of the auditory nerve We speak of *this* sensation and *that* idea because we have fixed our attention upon the fact so individualized, and have chosen to consider it as a whole. But all the experiences we have at any moment are parts of one indivisible whole, and such distinctness as they have is the result of a gradual process of differencing brought about by attention and classification. Ward well says: "It is impossible for us now to imagine the effects of years of experience removed, or to picture the character of our infantile presentations" — sensations — "before our interests had led us habitually to concentrate attention on some and to ignore others, whose intensity thus diminished as that of the former increased. In place of the many things which we can now see and hear, not merely would there then be a confused presentation of the whole field of vision, and of a mass of indistinguished sounds, but even the difference between sights and sounds themselves would be without its present distinctness. Thus the farther we go back, the nearer we approach to a total presentation" — experience — ". . . in which differences are latent."

This, then, is the material first presented to the mind — an undifferenced, unindividualized, confused, indefinite mass of sensational experience due to the excitation of the various sensory nerves — an experience not of *this* and *that*

and the *other*, because attention has not discriminated the elements of experience into "thises" and "thats" and "others"; this is the material first presented to the mind through the senses. But what do the senses seem to tell us now?

What the Senses Tell us of Objects. — Put an apple on your table and sit far enough away from it to prevent it from affecting any sense but the sense of sight. What do you learn about it through the sense of sight? Merely its color. But what is color? A quality of objects, we should have said a little while ago. But have we not seen that this quality of objects, this color of the apple, is simply a sensation, a state of our minds? A sensation, we have seen, is that simple mental state that directly follows the last change in the brain that results from the stimulation of a sensory nerve. Is any nerve stimulated in this case? Yes; the optic nerve. The waves of light strike the retina of the eye and cause a change in it, and this in the adjacent particles of the optic nerve, and these in the particles next to them, and so on until the brain is reached; and then — what happens then? Why then, as we have seen, there follows a sensation of color.

Close your eyes now, and request a friend to bring the apple near enough to you to enable you to smell it. What does the sense of smell tell you about it? Simply its odor. But what is odor? Is it not evident that it is simply a sensation? It is unnecessary to repeat the reasonings of the last paragraph. We have again a stimulation of a sensory nerve, a change all along the nerve, a change in the brain, and then — a sensation.

Evidently *all that the senses tell us of objects is the*

sensations they produce in our minds. But this is not what they seem to tell us. They seem to tell us of *objects,* and of these (1) as having definite qualities, and (2) occupying a definite position in space. The apple that the sense of sight reveals to me is an object having certain definite qualities — round, red, mellow, etc. — and in a certain place — on the window-sill some ten feet away.

Problem of Perception. — In some way, then, those undifferenced, unindividualized, indefinite sensations with which our mental life began not only become definite, but are, as it were, projected out of us, and regarded as qualities of external objects. How do they get these three characteristics? (1) How does a sensation that was not first known even as a sensation of color, for example, become known as a definite sensation of color — say a particular shade of red? (2) How does it become localized — projected at a certain distance — say ten feet away? (3) How does it become regarded as a quality of an external object, such as an apple? To answer these three questions is to explain the problem of perception.

QUESTIONS ON THE TEXT.

1. Make a careful summary of the conclusions reached in the two lessons on sensation.
2. In what does knowledge consist?
3. What is the difference between scientific and unscientific knowledge?
4. Show that the first sensations can not be known.
5. What is meant by the assertion that knowledge takes its rise in sensation?
6. What is the character of our first sensations?

7. State and explain the quotation from Ward.

8. What do the senses tell us of objects?

9. What do they seem to tell us?

10. State the three questions which a theory of perception has to answer.

SUGGESTIVE QUESTIONS.

1. If the first sensation is not known, how can the knowledge of sensations originate?

2. Is the assertion, *knowledge begins with sensation*, equivalent to *all our ideas were derived from sensations?* If not, what is the difference?

3. What is the meaning of the terms, *sensationalist*, *empiricist*, *transcendentalist?*

LESSON XXIII.

PERCEPTION.

(*Continued.*)

We saw in the last lesson that what the senses really tell us of objects is *how they affect us — the sensations produced by them in our minds — but that they seem to tell us of objects themselves as having certain qualities, and occupying a certain place.*

What the Mind Does when it Perceives. — What does the mind do to its sensations of color and smell and taste in order to perceive colors, odors, and tastes as qualities of objects? It groups them together, does it not? When you look at an apple, you group its color, taste, and smell together as qualities of one object. Sully puts it as follows: "Sense-impressions" — he means sensations — "are the alphabet by which we spell out the objects presented to us. In order to grasp or apprehend these objects, these letters must be put together after the manner of words. Thus the apprehension of an apple by the eye involves the putting together of various sensations of sight, touch, and taste. This is the mind's own work, and is known as perception." He compares sensations to the letters of the alphabet; and precisely as in reading we put the letters b, r, i, c, k together and read "brick," so, in per-

ceiving, we put together certain sensations and thus gain a knowledge of objects.

But this grouping of sensations together is not all we do when we perceive. As long as your sensations *seem* to be sensations, you do not perceive. You perceive only when they seem to be what we have seen they are not— qualities actually forming a part of the objects in the world about us, or states of our own bodies.

To perceive, then, is to group sensations together and regard them as qualities of external objects. But is that entirely accurate? When we perceive an apple by the sense of sight, we group the sensation of color with recollections of past sensations — taste, smell, feeling of mellowness, etc. — do we not? Strictly speaking, then, what we do when we perceive is to make a group consisting of one or more sensations, and ideas of sensations, and regard the group as qualities of an external object.

The state of mind that results from perception is called a percept. We must be careful not to confuse this with *image*. While you are looking at an apple, your state of mind is a percept; when you turn your head away and think about it, the picture that you form of it is an image.

In order to reach a percept, the mind must take three steps: (1) it must be conscious of a definite sensation; (2) it must group this sensation with images of sensations already experienced; and (3) it must think of these sensations as qualities of objects having a more or less definite position in space.

To explain the problem of perception, then, is to explain how the mind comes to take these three steps.

I have no intention of attempting to explain perception. It is universally conceded to be one of the most difficult

subjects in Psychology. My purpose will be accomplished if we can get a definite idea of the problem that a theory of perception undertakes to solve, and some general idea of what seems to be the true solution.

Perhaps it will be more convenient to consider the problem of perception in the form in which it was stated in the last lesson, although the two forms are in fact identical, as a little consideration will enable us to see.

How the Mind Becomes Conscious of Definite Sensations. — (1) How is it that the mind becomes conscious of definite sensations — that unindividualized sensations come to be individualized, and known as such and such sensations? That question our study of attention enables us to answer. If a child's experience consisted entirely of sensations of sound, it is easy to see that the loudest — those having the character of greatest intensity — would be sure to be attended to in the course of time. They would stand out in the foreground of his consciousness — would be individualized — and thus lose the indefiniteness that characterizes a child's experiences in the beginnings of its mental life. Evidently, also, the pleasurable or painful character of its experiences would have the same effect, since it is likewise a cause of attention.

How Sensations Become Localized. — (2) How is it that these sensations become localized — projected into our bodies and into the external world? Very young children evidently do not localize their sensations. When painful operations are performed upon them, their hands do not need to be held, since they do not know where the pain is. How do they finally come to get this knowledge?

The Local Sign. — Whether your little finger is pinched, or touched, or burned, or bruised, or cut, you locate the sensation in it — you know that it is your little finger that is affected. How is it that you are able to do this? How is it that when such different sensations as those of a mere touch, a burn, a bruise, a cut, a pinch, report themselves to consciousness, you are able to refer them all to the same place? Precisely as you can tell what country an Irishman comes from as soon as you hear him talk. There are tall Irishmen and short Irishmen, stout Irishmen and lean Irishmen, Irishmen that are handsome and Irishmen that are homely; but, no matter how widely they differ in appearance, as soon as you hear one talk you know that he hails from the land of Erin. And precisely as the brogue of an Irishman enables you, as soon as you hear him speak, to tell his nationality, so, since we are able to locate in the same place the various sensations that arise in connection with the little finger, those sensations must have *some characteristic in common.* A mere touch, a burn, a bruise, a cut, a pinch, differing as widely as they do, could not be referred to the same place if they did not speak a language that betrayed their origin. The characteristic of our sensations — the brogue which betrays their origin — by means of which we are able to locate them, first in our bodies, and some of them afterwards in the external world, is called *the local sign.*

How Local Signs are Apprehended as Signs of Place. — But perhaps the first time you noticed the brogue of an Irishman you did not know what country he came from. If you had noticed it in a dozen or fifty people, without knowing they were from Ireland, you would not have

known that it was a mark of Irish nationality. Not until you knew that there was such a country as Ireland, and that the men whose brogue you noticed were natives of it, could the brogue of an Irishman mean to you what it means now. Granted, then, that the sensations we receive from the various parts of our bodies have each their own local signs, these local signs are still characteristics of sensations; how can the mind regard characteristics of sensations as signs of what is not sensation? Evidently it is possible only as the mind has in some way an idea of the thing signified. As a brogue could not mean Irish nationality if we did not know there is such a country as Ireland, so local signs could not be signs of locality if we had no idea of space. But the very thing we are trying to explain is how unlocalized, unspatialized sensations become localized. Are we to say that they have local signs, but that, in order that these signs may have any meaning, we must have the idea of space already? Certainly not; for by supposition all that we know is unlocalized sensations. But if we had no idea of space *before* the apprehension of these local signs, and if we must have it in order to use them, as we unquestionably do in localizing our sensations, *the local signs must have been originally apprehended as signs of place.* You can not explain why a certain brain change is followed by sensation; all you can say about it is that it is so. Nor can you explain why some of these sensations are sensations of color; when we say that it is so, we have reached the end of our string. The conclusion to which our reasoning leads us is that just as certain brain changes are followed by those mental facts which we call sensations, so the apprehension of certain characteristics of our sensations is followed by the apprehension

of space. We are able to locate our sensations; we could not do it in the beginning of our mental life; we could not locate widely different sensations in the same place if they did not have some common characteristic — some local sign; this local sign could not be to the mind a sign of place unless the idea of place *existed before, or began to exist at the same time with the apprehension of the local sign; the idea of place did not exist before; therefore it began to exist at the same time with the apprehension of the local sign.* Why it did we can not tell; but everything that we believe rests, in the last analysis, on the inexplicable.

What Local Signs Consist of. — Assuming the existence of local signs, and a native power to apprehend them as signs of place, we can see how the mind would gradually form an idea of the place occupied by the body. Certain sensations from the various parts of it, each having its own local sign, would give an account of the different localities where the nerve originated that occasioned them. With the idea of the place occupied by his body, the child would soon form an idea of the place occupied by bodies around him. By grasping first his wrist and then a stick, the place-occupying quality of his wrist would naturally be transferred to the stick.

As to what the local signs consist of, there is considerable diversity of opinion. Indeed, it is a question of so much difficulty that the discussion of it is out of place in an elementary text. I will merely add that only the sensations of sight and touch and the muscular sense seem to have local signs, seem to possess characteristics that give information as to place.

Why do we Group our Sensations together?—(3) How do we come to group our sensations together and regard them as qualities of external objects?

Briefly, *because they occur together, or in an invariable order.* Every moment of our waking lives we are experiencing sounds and touches and tastes and smells and colors. Those which we are in the habit of experiencing together, or in connection with each other, we refer, through the influence of the laws of association, to the same thing. A physician named Cheselden performed an operation upon a man who was born blind, which restored the man's sight. When he first began to see, everything seemed to touch his eyes. Why? Because we can not *see* distance — because what we call seeing distance is interpreting the signs of distance — and he had not then learned the signs of distance. He knew cats and dogs perfectly by the sense of touch, but he could not distinguish them by sight. Why? Because he had not connected, by the law of association, the way a cat feels with the way a cat looks. Looking at a cat one day shortly after his sight was restored, and being in doubt as to what it was, he caught hold of it and said, "Ah, pussie, I shall know you next time." Why? Because he associated the impression she made upon his mind through sight with the impression made through touch. A child sees a robin on a sunflower,[1] and hears it sing. He does not connect the odor and color of the sunflower with the color and song of the robin, because they *do not habitually occur together.* If every time the child saw a sunflower a robin was on it, and if he never saw a robin except on a sun-

[1] This illustration was suggested by one of Ward's in the *Encyclopædia Britannica.*

flower, he would connect them together as parts of one whole. The odor, feel, taste, color, and solidity of an apple are all grouped together because they invariably occur together. When we have one of these experiences, the law of association by contiguity makes us think of the rest.

Summary. — Summing up, then, (1) Attention to indefinite sensations makes them definite — enables us to take the first step towards the formation of a percept. (2) As these sensations become definite, the mind gradually becomes conscious of local *signs* which some of them possess, and by a *native, original power of interpretation refers the sensations possessing them to a certain place.* (3) Through the laws of association the sensations which occur together are referred to the same place and regarded as qualities of the same thing.

QUESTIONS ON THE TEXT.

1. Summarize the conclusions reached in the preceding lesson.
2. State and explain Sully's comparison.
3. What does the mind do to its sensations when it perceives?
4. What is the difference between a percept and an image?
5. Explain how the mind becomes conscious of definite sensations.
6. Explain how it comes to localize them.
7. What is a local sign, and how do you know our sensations have such signs?
8. How is it that the mind is able to interpret the local signs of sensation as signs of place?
9. How do we come to group our sensations together and regard them as qualities of external objects?
10. Explain the case of the boy whose sight was restored by an operation performed by Cheselden.

SUGGESTIVE QUESTIONS.

1. Show the identity of the two forms in which the problem of perception has been stated.

2. When you are in a car that is not moving and a train passes by, your own car seems to be in motion. Why?

3. The air of Italy is very clear, that of England very thick. What sort of mistakes would an Englishman make in judging of distance in Italy, and what sort would an Italian make in England, and why?

4. What evidences do young children show of mistakes in judging of distances?

5. A child of three wanted her mother to go up stairs with her in order that she might get the stars. Account for her mistake.

LESSON XXIV.

PERCEPTION AND EDUCATION.

We Create our own Worlds. — Professor Davidson says that to a very large extent every human being creates his own world. Careful reflection upon the conclusions reached in the two preceding lessons will convince us that this is true. We are all familiar with the ordinary assumption that the world exists outside of us, already made, and that the senses constitute a sort of transparent medium through which it impresses itself upon the mind. But we have learned that the material with which the senses originally furnish the mind is not a knowledge of the world, is not even a knowledge of definite sensations, but an indescribably confused and mixed-up mass of sentient experience, which Professor James has aptly described as one "blooming confusion."

The Material. — Now, the gradual transformation of this blooming confusion into the world in which each of us lives is the mind's own work. This blooming confusion constitutes the bricks out of which the mind erects that imposing and stately structure which the senses now seem to directly present to us as the world.

Probably there is no sentence in this book which it will be more difficult for most of us cordially to assent to than

this. But, as it seems to me of the first importance that we should vividly realize it, I beg to call attention to some illustrations of its truth in addition to the arguments of the preceding lessons.

Illustrations. — We all know that there is a difference between the world of the man blind from birth, and that of the man who can see; between that of the man deaf from birth, and that of the man who can hear. The world of the man blind from birth contains no colors; that of the deaf man, no sounds.

As the blind man is shut out from a whole world that is open to us, so a man whose sense of sight is highly cultivated lives in a world into which the ordinary man can not enter. He sees a thousand delicate colors, a thousand gradations of light and shade, that are as entirely beyond the range of the ordinary man's vision as though they came through a new sense. Read Ruskin's essay on the sky and then say if the sky he saw and the sky which we see are the same. "Clear" or "cloudy" satisfies us as a description of the sky. That would be as inadequate a description of the sky as it would be of a typical American to say that he is a human being!

The same kind of difference exists between the world of a man any of whose senses is well trained, and that of a man whose corresponding sense is untrained. Read Eve's description of Eden in Milton's *Paradise Lost:*

> . . . . "Fragrant the fertile Earth
> After soft showers; and sweet the coming on
> Of grateful Evening mild; then silent Night,
> With this her solemn bird, and this fair Moon
> And these the gems of Heaven, her starry train;
> But neither breath of Morn, when she ascends

> With charm of earliest birds; nor rising Sun
> On this delightful land; nor herb, fruit, flower,
> Glistering with dew; nor fragrance after showers;
> Nor grateful Evening mild; nor silent Night,
> With this her solemn bird, nor walk by moon,
> Or glittering star-light, without thee is sweet" —

Read this and you will note how full Milton's world was of odors — "fragrant the fertile Earth after soft showers" — and sounds — "the silent Night," "charm of earliest birds" — and delicate shades of color — "and sweet the coming on of grateful Evening mild." For a man who has never noticed the fragrance of fertile fields after soft showers, who has never noted the gradual dying of the day as grateful evening comes on, who has never been charmed by songs of earliest birds, these things are as though they did not exist; they form no part of the world in which he consciously lives; they are without effect upon his mental life.

We Create our Moral Worlds. — We create in the same sense our moral world. We remember some of the charges that were brought against Washington in the fierce party struggles of his administration — that he would not accept any office from 1783 to 1789 because there was none exalted enough to satisfy his ambition; that his professed wish, not to accept the presidency a second term, was a mere pretense made because he was afraid he could not be elected; that the fear that he could not be elected caused him to declare that he would not accept the presidency for a third term. It is altogether possible that many men believed these charges. Men who act from motives of self-interest alone can not realize the possibility of anything else.

Problem of Education. — The problem of education, then, is to help the pupil create the right kind of world, such a world as will form the basis for wise thought and intelligent action, at the same time that it contributes to the noblest pleasures of life. The right kind of so-called cultivation of the observing powers consists in helping the pupil to note these things which should enter into his world, with the hope that by this means he will acquire the power to continue the proper creation of his world without help from teachers.

Importance of the Training of Observation. — From this point of view, the overmastering importance of the training of observation becomes self-evident. Men pay great attention to the garments with which they clothe their bodies, to the houses with which they shelter themselves. How trifling are these things in value in comparison with the home which the mind must make for itself. For the world is the mind's home. Are we in such constant presence of law, order, and rationality as to make anything but rational action seem repulsive? Or is our world a world of vague and chaotic impressions, where things seem to happen by chance? Are we conscious of the beauties of sunrise and sunset, of spring and autumn, of hill and valley, of meadow and woodland, or are the great walls of nature's picture galleries blank, dreary spaces staring upon equally blank and dreary minds? Is the life of struggle and toil of the men and women about us lighted up for our thinking by some elements of unselfishness, by some bits of heroism, or does it differ from a pack of hounds, struggling to get some pieces of meat which have been thrown among them, only by some super-

ficial varnishes called politeness, regard for the opinion of others — which have least influence precisely where they are needed most? The answer to all these questions depends on the nature of the world which we have made for ourselves.

How Observation is Cultivated. — When we so conceive the matter, and when we remember the occupations with which the child is afflicted in the average primary school — dreary, mechanical memorizing of a lot of dreary, unmeaning symbols — we can hardly help congratulating ourselves that the laws of most States forbid children to be sent to school before the age of six — before they have had some of that direct contact with nature which is the most potent stimulus to the proper conception of the world. Dr. Dewey tells us of a swimming-school in Chicago where all the motions are taught on dry land. And when a boy who had mastered the theory of swimming first tried to put it into practice, he was able to report the results of his experiment in a single word: "sunk." As well try to teach swimming on dry land, bicycling in a carriage, skating in summer as try to help a pupil form right conceptions of the world except through constant contact with it. Dr. Harris calls Colonel Parker the ideal primary teacher, and in Colonel Parker's school the primary pupils spent the greater part of their time out-of-doors.

Opinion of School Authorities. — But this is a waste of time, the school authorities are likely to say. They think it better for us to employ our pupils in memorizing the names of the capitals of the various countries of the

world, the lengths of the rivers, the heights of the mountains, and so on. It is our fault that they do. If they make a fetich of books, it is because we teachers have done so. Let us be convinced ourselves that books are only means to ends, and then we can convince the public. The difficulty is that we are unable to shake ourselves free from the notion that education consists in the knowledge of books. Instead of regarding books as foot-notes to the great texts of nature and mind, we cause our pupils to turn away from the study of mind and nature that they may give all their time to the study of books. Let us shake ourselves free from this burdensome tradition, and then we may hope that the general public will become free also.

Our Present Resources. — Indeed, in so far as we are really convinced of the importance of this first-hand study of nature, we are not without resources even now. If we can not take our pupils to nature, we can induce them to go and tell us what they have seen. The knowledge that they will have to give an account of what they have seen will be a motive for observing more carefully than they otherwise would have done. And indeed, unless you are yourself a loving observer of nature, your company would be of little service to them.

Qualifications of a Good Primary Teacher. — In the School of the Far-off Future, when men will universally realize the importance of the proper development of the various faculties of the mind as keenly as trained physiologists to-day realize the importance of the health of the various organs of the body, in that school, I believe no teacher will be allowed to enter — at least in the primary

grades — until he has stood certain tests that would seem very curious to us. Is the face of nature indifferent to him? Are her smiles in summer and her frowns in winter alike lost on him? Can he look upon the brooks that "fret" along their channels and the sheep and the cows grazing in the meadows and the wild roses growing along the hedge-rows and hear the songs of birds with no feelings of gladness? If so, I believe he will be regarded as lacking an essential element of a teacher of boys and girls. The ideal teacher of the ideal school will look on the face of nature with something of the same fondness with which the mother looks on the face of her child. As every act of her child is an object of interest to the mother, so every detail of nature will be of interest to this teacher, and he will watch the changes that pass over the face of nature as winter gives way to spring, and spring to summer, and summer gradually dies away into autumn, with something of the same sad and yet fond interest which the mother bestows upon her daughter as she travels on the road to womanhood.

What Children should be Taught to Observe. — But we are not living in the future, and we have to take ourselves as we do our pupils — as we are, and make the best of us. And it seems to me that if we do not care for nature we may realize the importance of helping our pupils care for it; and to do this, the only thing we can do is to give them motives for attending to it more closely than they otherwise would have done. You might have them make lists of the various trees and flowers and plants and birds of the neighborhood, and note the dates when the trees begin to put forth their leaves and the flowers to

bloom and the birds to build their nests. If the birds are of a migratory sort, you should have your pupils observe when they come and when they go, and, in any case, what they feed on, and how they build their nests. You should have a school museum composed entirely of interesting objects that they have collected. In such ways you may induce them to become familiar with every bird and tree and flower and plant in the neighborhood, and during the process three-fourths of them will have acquired such an interest in nature as will make them good observers for life.

Drawing. — You can turn their fondness for drawing into account in the same direction. Have them draw not pictures, but real objects from memory, and the result will be that the next time the object is seen it will be observed much more closely, and the image of it will be fixed in the mind much more definitely.

Object Lessons. — You should give object lessons. But if these lessons are to have any value, they must be carefully prepared and carefully given. Some teachers seem to imagine that there is a virtue in an object lesson as such; but, in the nature of the case, this is not so. If an object lesson is of any use in cultivating the observing powers of your pupils, it is because it induces them to observe more closely than they otherwise would have done; if it does not do that, it will leave their observing powers just where it found them.

An object lesson may be made to serve two important purposes besides furnishing motives to your pupils to observe: You may make it a means of imparting knowledge, and of enlarging the range of their vocabulary.

Preparation of Object Lessons. — When you are preparing an object lesson, you should make up your mind in precisely what ways you will reach these various ends. You will, of course, conduct it for the most part by asking questions. If you are dealing with little children, you will begin by asking them questions which they can answer with ease, *for the sake of interesting them in the lesson.* Children like to display their powers, and they like lessons which give them opportunities to do that. But you will be careful to note that to interest them in the lesson *is by no means the same thing as interesting them in the object.* You interest them in the object when you ask them questions about it that they can not answer, but to which they can find the answer by more careful observation. Accordingly, a part of your preparation of an object lesson should consist of such a careful study of the object as will enable you to observe certain qualities which you think have escaped their attention, in order that you may be able to induce them to study it more carefully than they have ever done before, and give them the pleasure of finding out something for themselves.

You should carefully decide also precisely to what extent you wish to enlarge their vocabulary. If, for instance, you are giving a lesson on glass, you can arrange your questions so as to get them to tell you that they can see through it. Then you can tell them that things which can be seen through are transparent, and ask them to name as many transparent things as they can think of.

Compayre quotes a sensible paragraph from M. Buisson on this subject: "It is not desirable to have the object lesson begin and end at a fixed hour. Let it be given on the occasion of a reading or writing lesson, or in connec-

tion with the dictation exercise, with the lesson in history, geography, or grammar. If it occupies two minutes instead of twenty, it will be only the better for that. Often it will consist, not in a series of consecutive questions, but in one spirited, precise, and pointed question, which will provoke a reply of the same sort."

QUESTIONS ON THE TEXT.

1. What is the meaning of Professor Davidson's statement?
2. What does Professor James mean by "blooming confusion"?
3. What is meant by the cultivation of the observing powers, and why is it so important?
4. What can we do in the way of training the senses of our pupils?
5. What do you regard as the best means of helping your pupils form habits of careful observation?
6. How should an object lesson be prepared, and for what purposes should object lessons be given?

SUGGESTIVE QUESTIONS.

1. In what classes of objects are children most interested?
2. Have you noticed instances in which the home surroundings of children exert an influence upon the objects they are interested in?
3. At what age are children most interested in objects?
4. Show the relation between the conclusions reached in this lesson and in the lessons on attention.

LESSON XXV.

MEMORY.

Elements of Memory. — We can conceive of a mind with no capacity except the power to experience sensations — a mind limited to the present — a mind whose experiences leave no trace upon it. Such a mind would be destitute of the power of *retention.* We can conceive of a mind like our own in that every sensation, every experience leaves "the mind different, as every physical change leaves the body different," but unlike ours in that an experience once gone never returns. As every minute in that stately and solemn procession that we call the March of the Years goes by never to return, so we can conceive that the shadow of those experiences that we are conscious of from moment to moment, in spite of the fact that each of them left the mind different, might never fall across our conscious life. Such a mind would be without the power of *reproduction.* We can conceive of a mind, also, with laws of association like our own — a mind constantly conscious of images of some of its past experiences, but without the faintest notion that they were *images* — a mind with the power to make pictures or copies of past events, but without the power to refer them to their original. Such a mind would be destitute of the power of *re-cognition* — re-knowing. Or we can conceive of a mind with

the power to reproduce and re-know its past experiences, but without the power to locate them — a mind to which "yesterday," "last week," "last month," "last year," would mean the same thing — the past, — a mind all of whose recollections were like those we have sometimes been conscious of when we have seen a face that we were *sure* we had seen before, but with no idea of where or when. Such a mind would be without the power of *localization*.[1]

These four powers, then — retention, reproduction, recognition, and localization — constitute the power that we call memory. You would not, indeed, say that you do not remember a thing when you are not thinking about it. But you would say that a mind that did not possess all four of these powers can not remember as we can, and that one without the last two can not remember at all. A complete explanation of memory, then, would require a complete explanation of these four powers.

Retention. — In thinking about retention, we must be on our guard against being led into mistakes by the literal meaning of the word. The act of retaining seems to imply a place where things are retained, and so we sometimes permit ourselves to think of memory as a great storehouse, where all the lumber of our past experience is accumulated. This was the opinion of Herbart. Says the Herbartian, Lindner: "That concepts are not destroyed by passing out of consciousness is proved by the fact of reproduction." And Leibniz: "No idea leaves the mind, but each idea becomes invisible for a time or permanently. To remember is to have new consciousness of what has not ceased

[1] *See* Baldwin's *Psychology*, p. 151.

to exist in the soul." But when we begin to think seriously, it is hard to believe that the "storehouse" of memory is more than a metaphor. I had the toothache yesterday; to-day I recall the fact. I have an image of it. But the image or idea of the toothache is not the original fact. The toothache was intensely painful; the image of it is not at all so. If you ask where the image was from the time it dropped out of consciousness until the time we thought of it to-day, the proper answer is, as Baldwin says, *Nowhere*. When I had the toothache, I was conscious of a sensation. When I ceased to have it, the sensation ceased. When the idea of it is recalled to my mind, I remember it. Between the disappearance of the sensation and the rise of the image my mind was inactive with reference to it; there was neither sensation nor image of it in existence. So far as consciousness is concerned, then, retention does not denote an act, but states a fact — the fact that *experiences of the past leave the mind different*, since it often happens that we can recall them.

Retention a Physical Fact. — The probability is that retention is, in part at least, a purely physical fact. The facts already cited in an earlier chapter — of impairment of memory in consequence of an injury to the brain — indicate this. Ribot states the argument very forcibly: "If, with closed eyes, we keep for a length of time an image of very lively colors before the imagination, and then opening the eyes suddenly, we fix them upon a white surface, we see thereon for an instant the image contemplated in imagination, but in *the complementary color*. This fact, as is observed by Wundt, from whom we borrow it, proves that the nerve action is the same in the two

cases — in the sense perception and in the memory." Professor Ladd also puts the case clearly: "That the mental phenomena which lead us to speak of the retentive power of memory have a physical basis, there can be no doubt. . . . Every sensory impulse must produce changes both in the end organs and the central organs; and although these changes vanish, so far as their effect in the corresponding phenomena of conscious mind is concerned, they nevertheless can not fail to leave the organs in different condition from that in which they were found."[1] Fouillée makes a concise and graphic statement of some of the facts that support this opinion: "It is evident that there is in memory something automatic, capable of functioning alone; even the diseases and illusions to which it is subject prove that there is something delicate and fragile in this marvel of natural mechanism. If a scholar, after having received a violent blow on the head, forgets all his knowledge of Greek without forgetting anything else, and if afterwards, as the result of a second blow, he suddenly regains his lost Greek, it is difficult to see in memory an act entirely spiritual."

Reproduction and Laws of Association. — The laws in accordance with which ideas and images of our past experiences arise in our minds have already been considered. They are, as we know, the laws of association. We say that any thought, idea, or experience tends to recall similar thoughts, ideas, or experiences, and all other thoughts or experiences that were in the mind at the same time.

A consideration of this law will enable us to see how it

[1] Ladd's *Physiological Psychology*, p. 548

happens that we are sometimes conscious of re-knowing things without being able to recall the place where, or the time when, the thing was originally known, or any of the circumstances connected with it. It is because the thing recalls the past experience *simply* by the law of association by similarity. Usually, as we know, along with the similar idea are recalled other ideas or thoughts that were in the mind at the same time; and it is these other thoughts or ideas that enable us to *localize* our recollections. You saw a stranger yesterday in the post-office. To-day you see him again, and as soon as you see him you are conscious of that feeling of recognition — you know that you have seen him before. How do you know it? Because of the likeness between your percept of him and the image that arises in the mind. But suppose the image comes entirely unattended — suppose it comes without any of the other ideas that were in the mind at the same time — then you will have the feeling that you are re-knowing the person, but where or when you originally knew him you will be utterly unable to tell. You will not know where, for by supposition the image of the post-office does not come into your mind with the image of the person you saw there. You will not know when, for none of the images or thoughts that fix the time come with the image — no thought of yesterday, no thought of what you were or had been doing. As we can not locate the place of a thing except in relation to other places — London in relation to England, England to Europe, Europe to the earth, the earth to the solar system, the solar system to the universe, the universe to what? — so we can not locate the time of an event except with reference to the time of other events, succeeding, preceding, or contemporaneous. (What does

1891 mean?) When, therefore, an image of a past experience arises in our minds, unattended by any of its former companions, we can only feel that we *re*-know it, without being able to tell where or when.

How we Know that Present Images are Copies of Past Experiences. — This explanation of the fact would seem to make the explanation of our ordinary experiences in memory very simple. Usually when we see a thing a second time that we remember to have seen before, we remember when and where we saw it. The reason is, as we now see, that the image of the past fact is attended by some of the ideas that were in the mind at the same time, so that its place and time are fixed. *But how do we know that images of which we are conscious in the present are copies of experiences that we had an hour ago, or rather what makes us believe it?* You sit down and begin to indulge in the pleasure of retrospection. You think of what happened an hour ago, yesterday, last year, ten years ago — when you were a child, first finding yourself in this strange world. But your base of operations is always the present. How is it that ideas *now in the mind are retrojected, some of them an hour back, others a day, others a year, others a decade, others for a period not to be mentioned in such a public place?* Precisely as in perception, we refer some of the sensations of color to objects ten feet away, others to objects a mile — ten miles — away, while all of them are in our own minds, so in memory we retroject ideas, *all of which are experiences of the present,* some of them an hour, others a day, others a week, others a score of years into our past lives. As Mr. Ward puts it, "We may, if we represent *succession* as a line, represent

simultaneity as a second line at right angles to the first." As our experiences actually occur to us, they are in succession, the memory images of them at any one time are in the mind simultaneously. How are we able to retroject present memory images into that place in the past occupied by the experiences of which they are the copies?

Temporal Signs. — It is the case of the Irishman's brogue over again. As we know the nationality of an Irishman by the way he speaks; as we refer our sensations to a certain place by their local signs; so we locate images of past experiences at a certain point in our past lives by their *temporal signs*. As the local signs are certain characteristics that all sensations, however different, which arise from the stimulation of the same part of the body have in common, so the temporal signs are certain common characteristics possessed by all ideas that we refer to some general point of time, however different those ideas may be. In other words, all the events of Christmas Day, 1888, that I am able to recall and localize at that point in the past are represented in my mind by ideas or images that have certain common characteristics. These common characteristics — this brogue that enables me to refer my recollections to their proper time in the past — are called temporal signs.

QUESTIONS ON THE TEXT.

1. Define retention, reproduction, recognition, and localization, and show that they are essential to a complete act of memory.
2. Summarize the results reached in the chapter on the association of ideas.

3. How is it that we sometimes know that we have seen a thing without being able to tell where or when?

4. What was the illustration of the Irishman's brogue used to show in one of the chapters on perception?

5. What is the difference between local and temporal signs?

6. How is it that the mind is able to regard its local signs as signs of place?

7. What is the difference between a percept and an image?

8. Show that we are able to locate a thing either in time or place only by its relation to other things.

SUGGESTIVE QUESTIONS.

1. Do you know any facts indicating that retention is made possible through a modification of the brain that results from each of the experiences of the mind?

2. If that is the explanation of retention, how would you explain reproduction?

3. On the supposition that the mind has temporal signs, how would you explain its power to interpret them as signs of time?

4. At about what age do children begin to understand the meaning of *yesterday*, *last week*, etc.?

5. Why is it that this knowledge comes so late?

6. Are you sure that such a thing as absolute forgetfulness ever takes place?

LESSON XXVI.

THE CULTIVATION OF THE MEMORY.

Rules for Remembering. — Bearing in mind our conclusion that the basis of memory is in part physical, it is but a step to the further conclusion that whatever is learned in a state of excellent bodily health, other things being equal, is most likely to be remembered. Facts of every-day experience confirm this view. We all know how likely we are to forget things that we learn when we are suffering from a headache, indigestion, or the like.

Health and Memory. — Says a popular writer, Mr. Halleck: "The first rule for securing a better memory is to pay attention to the laws of hygiene, to endeavor by all means to keep the health at high-water mark."

Attention and Memory. — Another rule, equally confirmed by daily observation, is: Attend carefully and closely to the facts you wish to remember. We have seen in a previous chapter how much memory depends on attention, and we know how much it depends on interest. But interest in a subject increases the power to remember it chiefly through the influence of interest on attention. Many of us find it hard to remember faces. This difficulty

would be lessened if we carefully noted the faces of people we wish to remember.

Drawing and Memory of Form. — Every teacher knows how the drawing of objects tends to fix their form in the mind. The reason is that in drawing objects we must attend to them. Sir Francis Galton says that M. Boisbaudran trained the visual memory of his pupils with extraordinary success. His method was to have his pupils study "the models thoroughly before they tried to draw them from memory. One favorite expedient was to associate the sight memory with the muscular memory by making his pupils follow at a distance the outlines of the figures with a pencil held in their hands. After three or four months' practice, their visual memory became greatly strengthened. They had no difficulty in summoning images at will, in holding them steady, and in drawing them."

Understanding and Memory. — A third rule for facilitating the acquisition of memory is: Get a clear comprehension of the thing you wish to remember. The famous experiments of Elbringhaus illustrate this in a striking way. He found that he could memorize a stanza of poetry in about one tenth of the time required to memorize the same amount of nonsense syllables. I asked a capable student of Johns Hopkins University some years ago to give me an account of a lecture he had just listened to. "I can not do it," was his reply. "It was not logical."

Association and Memory. — The last example belongs, perhaps, with more propriety under the fourth and most important rule: Multiply associations, entangle the fact you

wish to remember in a net of as many associations as possible, especially those that are logical.

In studying the association of ideas, we saw that mechanical association is that kind of association in consequence of which anything we are thinking of tends to make us think of something else we thought of at or about the same time; logical or rational association, that which tends to make us think of something between which and the thing we are thinking of the mind has perceived *inner* relations.

Educational Value of Mechanical Association. — We only need to call to mind instances of the former to realize its comparative educational value. Consider, for example, the following: "Thou didst swear to me, upon a parcel-gilt goblet, sitting in my dolphin chamber, at the round table, by a sea-coal fire, upon Wednesday in Whitsun week, when the prince broke thy head for liking his father to a singing man of Windsor; thou didst swear to me then, as I was washing thy wound, to marry me, and make me my lady thy wife." — *Henry IV.* This, of course, is an example of mechanical association, and it enables us to realize that, so far as our thoughts are controlled by that kind of association, they will be directed by chance and accident rather than intelligence.

When your pupils associate things logically, they are exercising and therefore developing the higher powers of their minds.

Of Logical Association. — Logical or rational association is association according to some inner relation. But before this relation can form the basis of an association it

must be apprehended, and this act of apprehension is an exercise of the higher powers of the mind. Fitch says that the difference between a wise man and one who is not wise consists less in the things he knows than in the way he knows them. The wise man knows things in their relations, I think he would say, has his knowledge classified, has associated what he knows rationally. In the same paragraph he observes that an historical fact is learned to little purpose unless it is seen in its bearing on some political, economical, or moral law. I am sure you agree with him. We all know that a teacher may know facts enough about history to pass an ordinary examination very creditably, and yet know them to very little purpose because he knows them in a purely mechanical way.

Logical Association Increases the Interest. — Another reason for helping our pupils cultivate their logical memory is that they are more interested in what they have associated logically. To learn facts by means of the mechanical memory is an irksome task; to apprehend the relations between those facts, to associate them logically is a delightful labor, especially if the pupil has been led to discern for himself the relations which form the basis of the association. Now interest, as we know, is a great help to the memory. But apart from that it is quite as important for you to interest your pupils for other reasons. If we interest our pupils, we do what we can to make them students for life, and that is a much more important matter than having them learn well any particular subject. Indeed, I think you will admit that if we had to choose between having our pupils careless and indifferent to study at school, and having

them studious through life, it would be entirely wise for us to choose the latter.

Makes Knowledge Usable. — Another reason for cultivating the logical memory is that any one with that kind of memory can use what he knows. Some one has said that a man could not stand under a tree with Edmund Burke during a shower of rain without perceiving that he was in the company of a very remarkable man. The reason doubtless was, not that Burke was continually saying brilliant or witty things, but that he said nothing that was not to the point. A man may know a great deal mechanically, and yet be unable to use his knowledge, because he can not think of anything when he wants it, and can not see how he can use it when he does think of it. Such a person's mind is like a well-filled scrap bag; there is a good deal in it, but everything is in such disorder that you have to turn it upside down before you can get any particular thing out of it.

You have doubtless heard the saying, "Great memory, little wit." I think we can now see what truth there is in it. It is altogether possible for a person to have a great mechanical memory and have very little mind besides. Indeed, there are plenty of cases on record in which idiots have shown remarkable power of remembering facts mechanically. But to have a fine logical memory and a poor mind is an impossibility.

Mechanical Memory of Many Educated Persons. — Educated persons often complain that their memory is not so good as it was in their youth. What they mean is that their mechanical memory is not so good. They have

acquired the very excellent habit of fixing their attention on important matters and neglecting the trivial events that are not worth remembering; and because they forget them, while their uneducated friends remember them, they imagine that their memory suffers by comparison. But it is not so. The educated man cultivates his logical memory, and neglects, for the most part, his mechanical memory; while the uneducated man does the exact opposite. It is natural, therefore, for the uneducated to have better mechanical memories than the educated. As Dr. Harris observes, if we want the child's memory we can have it. We can force ourselves to ignore the difference between the important and the unimportant, and attend impartially to everything that comes before us. So far as we succeed in doing this, we shall remember important and unimportant matters with equal accuracy. But is such a memory desirable? No, because in that case we shall remember important matters less accurately than we should have done otherwise.

But I do not mean to convey the impression that everything can be learned by means of the logical memory. Logical association consists in connecting facts together by means of some inner relation. But before we can see the relations between facts, we must know the facts themselves.

Place for the Mechanical Memory. — For this reason there is a place for the mechanical memory in education. But here you should note that there are as many different memories, so to speak, as there are kinds of facts to be remembered. There is a memory of colors, a memory of dates, a memory of rocks, and so on. You know very

well that some of your pupils have an excellent memory for geography, others for grammar, others for history, and so on.

No such Thing as the Universal Cultivation of the Memory. — Now, since memory is not one faculty, but many, it follows that there is no such thing as a universal cultivation of the memory. If you find your memory weak in any particular direction, what you ought to do is to practice it on the kind of things you find most difficulty in remembering. Dr. Harris gives an interesting and instructive account of his own efforts in cultivating his mechanical memory. When he was about eighteen, he tells us, he had great difficulty in remembering dates. He cultivated his memory for them in the following manner: The first day he learned the dates of accession of three or four English kings; the next day he learned two or three more, and reviewed those he learned the preceding day; the next day, again reviewing from the beginning, he added two or three more to the list, and so on, until he had thoroughly learned the entire list. After two or three months he found he had forgotten some of them, so he learned them again; and after two or three years he repeated the operation. By such training, he tells us, his memory for dates was so improved that he has never since had any trouble in remembering such dates as he cared to remember. He cultivated his memory for names in a similar way.

When Verbal Memorizing is Desirable. — It follows that verbal memorizing, although mechanical memorizing, is not necessarily bad. On the contrary, under certain circumstances it is essential. Fitch has stated with great

clearness the circumstances under which it is valuable: "When the object is to have thoughts, facts, reasonings reproduced, seek to have them reproduced in the pupil's own words. Do not set the faculty of mere verbal memory to work. But when the words themselves in which a fact is embodied have some special fitness or beauty of their own — when they represent some scientific datum or central truth, which could not otherwise be so well expressed — then see that the form as well as the substance of the expression is learned by heart." Compayre, commenting on this, says that "according to this, it is easy to fix the limit which verbal repetition should not pass. In grammar, the principal rules; in arithmetic, the definitions; in geometry, the theorems; in the sciences in general, the formulas; in history, a few summaries; in geography, the explanation of a few technical terms; in ethics, a few maxims — these are the things which the child ought to know word for word — on the condition, of course, that he perfectly understands the meaning of what he recites, and that his attention is called not less to the thought than to the form of the expression." To this I would add that no week should be allowed to pass by in which the pupil is not encouraged to learn, word for word, some beautiful sentence or paragraph, and thus store his mind with beautiful thoughts, beautifully expressed.

Danger of Underrating the Uses of the Mechanical Memory. — In the healthy reaction against the mechanical methods in vogue half a century ago, we are in danger of undervaluing the mechanical memory, especially in connection with literature. We are apt to think that if a pupil has a thought the form in which he holds it is a

matter of no consequence. Says Professor Davidson: "We are inclined to be content if we can get information rapidly and easily into the heads of our pupils, and trouble ourselves very little about the manner in which it is accomplished. The Greeks were wiser. They knew that the *how* is more important than the *what;* that conceptions which are presented to the mind clothed in poetic light and heat are far more readily assimilated and retained, and exercise a far deeper and more lasting influence upon the imagination, the feelings, and the will, than those which come to it in the cold gray garb of ordinary prose."

Difficulty of Making a Practical Application of the Pedagogical Principles in Connection with Memory. — And now I have said substantially what I intended about mechanical and rational association, and mechanical and rational memory. I believe we shall agree that, of all the subjects within the whole range of Psychology, there is scarcely one of more practical importance. We are constantly making use of the memory of our pupils. *How* we make use of it is the question, the answer to which largely determines the quality of our work. But however clearly we understand the difference between logical and mechanical memory, and the circumstances under which each ought to be cultivated, I am afraid we shall have difficulty in putting our ideas into practice. Why? *Because we can not help our pupils associate facts logically until they are so associated in our own minds.* Pestalozzi thought that it was possible to *mechanize instruction* so perfectly that any teacher who had mastered the mechanism could succeed. He was profoundly mistaken, not merely because a mechanism will not run itself — because a method, how-

ever excellent, needs various adaptations to various cases — but because good teaching is impossible without an ample and rational knowledge of the subject of instruction.

Illustrated by Arithmetic and History. — As long as the addition, subtraction, multiplication, and division of whole numbers seem to be entirely disconnected operations, and each of these entirely disconnected from the addition, subtraction, multiplication, and division of common fractions, and these from the same operations in decimal fractions, we can not enable our pupils to associate the facts of arithmetic rationally, because they are not so associated in our own mind. In like manner, as long as we see no connection between the very different kinds of people who settled at Plymouth and Jamestown, and the differences between the people of Massachusetts and the people of Virginia at the close of the Revolutionary War; as long as we see no connection between these differences and their reluctance to unite together under a single strong government; as long as we do not see how this reluctance could only be overcome by compromises in the Constitution which were in the nature of contradictions, which contradictions, under the influence of slavery, led to other contradictions — each party affirming its own view with passionate intensity — and these to the Civil War — until we see these things as clearly as the sun in the noonday heavens, American history is a sealed book to us, and it will be a sealed book to our pupils so far as help from us is concerned, because the facts are associated in our own minds in a merely mechanical way. In like manner, until we realize in detail to what extent the character, history, and institutions of a people are a matter of latitude, and

longitude, and soil, and climate; until we see that the explanation of the building of a Chicago in fifty years is to be found in the facts of physical geography; until we see that, if the soil and climate and other physical conditions of the North and South had been reversed, the parts they played in the Civil War would have been reversed — we can not teach geography properly, because we do not *know* geography in a rational or logical way.

In a word, to make a practical use of this distinction between logical and mechanical memory, it is not enough to understand it. We must know the subjects we undertake to teach in a logical or rational way, and the latter is as indispensable as the former.

QUESTIONS ON THE TEXT.

1. Summarize the conclusions reached in the lessons on the associations of ideas and memory.

2. Analyze the quotation from Henry IV. in order to show that it was the result of mechanical association.

3. State the various rules for cultivating the memory.

4. State the various reasons for cultivating the logical memory.

5. What does Fitch say is the difference between a wise man and one who is not wise?

6. How many memories has the mind?

7. How did Dr. Harris cultivate his memory for dates?

8. Under what circumstances is verbal memorizing desirable?

9. What did Pestalozzi think about mechanizing instruction, and why was he mistaken?

10. Illustrate the necessity of a rational knowledge of a subject in order to teach it well.

SUGGESTIVE QUESTIONS.

1. What light does this lesson throw on the kind of preparation a teacher should make?

2. Make a study of the children you meet to ascertain (1) the things they remember and why, and (2) the kind of memory they exercise most.

3. Which kind of memory should be chiefly exercised in the case of young pupils, and why?

4. "Betty," said a farmer's wife to her servant, "you must go to town for some things. You have such a bad memory that you always forget something, but see if you can remember them all this time." "I'm very sorry, ma'am," says Betty, "that I've such a bad memory, but it's not my fault; I wish I had a better one." "Now mind," said her mistress, "listen carefully to what I tell you. I want suet and currants for the pudding." "Yes, ma'am, suet and currants." "Then I want leeks and barley for the broth; don't forget them." "No, ma'am, leeks and barley; I sha'n't forget." "Then I want a shoulder of mutton, a pound of tea, a pound of coffee, and six pounds of sugar. And as you go by the dressmaker's, tell her she must bring out calico for the lining, some black thread, and a piece of narrow tape." "Yes, ma'am," says Betty, preparing to depart. "Oh, at the grocer's get a jar of black currant jam," adds the mistress. The farmer, who has been quietly listening to this conversation, calls Betty back when she has started, and asks her what she is going to do in town. "Well, sir, I'm going to get tea, sugar, a shoulder of mutton, coffee, coffee — let me see, there's something else." "That won't do," said the farmer; "you must arrange the things as the parson does his sermon, under different heads, or you won't remember them. Now, you have three things to think of — breakfast, dinner, and dressmaker." "Yes, sir." "What are you going to get for breakfast?" "Tea and coffee and sugar and jam," says Betty. "Where do you get these things?" "At the grocer's." "Very well. Now what will be the things put on the table at dinner?" "There'll be broth, meat, and pudding." "Now what have you to get for each of these?" "For the broth I have to get leeks and barley, for the meat I have to get a shoulder of mutton, and for the pudding I must get suet and currants." "Very good. Where will you get these things?" "I must get the leeks at the gardener's, the mutton and suet at the butcher's, and the barley and currants at the grocer's." "But you had something else to get at the grocer's." "Yes, sir, the things for breakfast — tea, coffee, sugar, and jam." "Very well. Then at the grocer's you have four

things to get for breakfast and two for dinner. When you go to the grocer's, think of one part of his counter as your breakfast table and another part as your dinner table, and go over the things wanted for breakfast and the things wanted for dinner. Then you will remember the four things for breakfast and the two for dinner. Then you will have two other places to go for the dinner. What are they?" "The gardener's for leeks, and the butcher's for meat and suet." "Very well. That is three of the places. What is the fourth?" "The dressmaker's to tell her to bring out calico, and thread, and tape for the dress." "Now," said her master, "I think you can tell me everything you are going for." "Yes," said Betty; "I'm going to the grocer's, the butcher's, and the gardener's. At the grocer's I'm going to get tea, coffee, sugar, and jam for breakfast, and barley and currants for dinner. But then I shall not have all the things for dinner, so I must go to the butcher's for a shoulder of mutton and suet, and for leeks to the gardener's. Then I must call at the dressmaker's to tell her to bring lining, tape, and thread for the dress." Off goes Betty and does everything she has to do. "Never tell us again," said her master, "that you can't help having a bad memory." — Tate's *Philosophy of Education*. What does this illustrate?

LESSON XXVII.

IMAGINATION.

Definition of Imagination. — If you ever watched the growth of the mind of a child, you doubtless noticed that he seemed to remember persons before he showed any signs of thinking of them when they are absent. A child shows in the most unmistakable ways that he remembers his father and mother some time before he gives any evidence of thinking of them when they are away. *The power of the mind to form ideas of things not present is called imagination.*

What is an Image? — We may call imagination the image-making faculty, if we give a broad enough meaning to *image*. We can think not only of absent persons, but of tastes, touches, hopes, fears, etc., no longer experienced. If, then, we define imagination as the image-making faculty, we must remember that an image is the *mental representation of any experience whatever.*

Two Kinds of Imagination. — There are two kinds of imagination. When a child cries for his absent mamma, the act of imagination evidently consists in holding before the mind a copy, more or less faithful, of the mother, as seen and known. But the same child will soon think of

things he has never seen — of things that have never come within the range of his experience. He will tell you of what he will do when he becomes a bird, or of good little girls putting a cat's eyes in after a bad dog has scratched them out — and much besides of the same sort. The first kind of imagination is called *reminiscent* or *reproductive*, since it reproduces past experiences; the second is called *constructive*, since it takes ideas or images furnished by the reproductive imagination and combines them into new wholes.

Difference between Reproductive Imagination and Memory. — "But what is the difference," you at once ask, "between reproductive imagination and memory? I hear a song, and it makes me think of the friend whom I heard sing it a few days ago; an image of my friend as singing the song rises before my mind. This, I suppose, is both an act of memory and reproductive imagination; what is the difference between the two?"

To begin with, in its early stages, memory exists without imagination. A child who knows his mamma when he sees her, but can not think of her when she is absent, illustrates this.

"But when he begins to think of his absent mamma, as he will by and by, what, then, is the difference between memory and reproductive imagination? When he thinks about her, does he not remember her, and is not his thought of her an image, and therefore the product of the imagination?" Yes; but there is a difference between simply thinking of her, or rather between simply *having the image of her in his mind*, and *knowing that image as the image of one he has seen.* The difference between

reproductive imagination and constructive imagination is that the images resulting from reproductive imagination are copies of past experiences, while those resulting from constructive imagination are not. Now, it is altogether possible for one to suppose that what are really products of reproductive imagination are products of constructive imagination, *because the images resulting from the act of reproductive imagination are not accompanied by a recollection of the original experiences.*

We shall see the relation between them from another point of view if we remember that the exercise of the reproductive imagination is a part, of which the memory of an absent object is the whole. There can be no memory of an absent object unless the image of it is in the mind, and that image is the product of the reproductive imagination. But having the image of an absent object, and remembering the object, are not the same. *There is no complete act of memory of an absent object until the image in the mind is recognized as the image of some particular object or thing already experienced.* Moreover, while a complete act of memory of an absent object involves retention, reproduction, recognition, and localization, the imagination of it requires but two — retention and reproduction. If the image of a past object or experience comes unattended by any of the images that formed a part of its original escort, it can not be localized — *i.e.*, completely remembered — nevertheless it is imagined. Also, it may not be recognized; even then it is imagined.

We saw in the last lesson that there is no such thing as a single faculty of memory; that we ought to speak of the memories rather than of the memory of the mind, since we have as many memories as there are classes of

facts to be remembered. The same is true of the imagination. Mr. Galton has done more perhaps than any other man to impress this fact upon the world. He sent out a long series of questions, the first group of which related to the illumination, definition, and coloring of the mental image, and were framed as follows:

"Before addressing yourself to any of the Questions on the opposite page, think of some definite object — suppose it is your breakfast-table as you sat down to it this morning — and consider carefully the picture that rises before your mind's eye.

"1. *Illumination.* — Is the image dim or fairly clear? Is its brightness comparable to that of the actual scene?

"2. *Definition.* — Are all the objects pretty well defined at the same time, or is the place of sharpest definition at any one moment more contracted than it is in a real scene?

"3. *Coloring.* — Are the colors of the china, of the toast, bread-crust, mustard, meat, parsley, or whatever may have been on the table, quite distinct and natural?"

The answers to these questions revealed the interesting fact that the clearness, and definiteness, and vividness of the images in men's mind vary in the most remarkable way from individual to individual.

Influence of the Will upon Imagination. — There is not a moment when images of one sort or another are not in our minds. Sometimes we ourselves determine to a considerable extent their character. As Dr. Reid said, "We seem to treat the thoughts that present themselves to the fancy" — imagination — "in crowds as a great man treats the courtiers who attend at his levee. They are all ambitious of his attention. He goes round the circle.

bestowing a bow upon one, a smile upon another, asks a short question of a third, while a fourth is honored with a particular conference; and the greater part have no particular mark of attention, but go as they came. It is true he can give no mark of his attention to those who were *not there*, but he has a sufficient number for making a choice and a distinction." If those who were treated so coolly had at once left, while those upon whom the great man smiled had stayed till some of their friends and relatives — whom they themselves summoned because of their kind treatment — were honored at their expense, the case would exactly illustrate the influence that we exert, whenever we choose, over the character of the images that throng through our minds. Those that we do not attend to, vanish; those that we do attend to, stay until we neglect them for the sake of those that come into our minds through their connection with them.

But sometimes the will abdicates, and lets one's thoughts take their own course. As the rider of a trusty horse might throw the reins on his neck, and let him wander at will across fields, through woods, over meadows, so we sometimes give full rein to our thoughts, and let them take us where they will. If we break in upon any such state for the purpose of making a study of it, I think that we shall usually find that the images in our minds are the products of constructive imagination — sometimes very grotesque ones.

Difference between Reproductive and Constructive Imagination. — To learn whether any particular image, or combination of images, is the product of reproductive or constructive imagination, all we have to do is to learn

whether or not it is a copy of a past experience. Our memories, of course, are defective, and we may be uncertain on that account; but, apart from that, we need be in no doubt whatever.

Applying this test, it is evident that when we learn anything from a book or from a friend we are exercising the constructive imagination. Reading is sometimes defined as thinking along prescribed lines; and if we carefully examine our own minds, we shall see that all thinking is done, for the most part, through images, either of things or words. When, then, we read, we form and combine images in a certain prescribed way — in the way prescribed by the language of the author — provided we understand him. When we listen to the conversation of a friend, we evidently do the same thing. Unless, therefore, our friend or book says precisely what we ourselves have thought, and in precisely the same way, it is evident that we grasp the thoughts by means of the constructive imagination.

When we find out a thing for ourselves, by the exercise of our own powers — the only other way in which we can learn anything — I think we shall see that is done through constructive imagination. A boy has a problem in arithmetic to solve. What is the first thing for him to do? Understand it, as we say; and this, we have just seen, he can only do through constructive imagination. When he clearly grasps the conditions stated in the problem, he asks what follows from them. He reasons that such and such a result would follow — which result is likewise imaged constructively, and so on to the end. Kepler wanted to know the shape of the path which the planets make in their journeys round the sun. He made guess after guess, each time comparing his guess with the facts,

until finally he was successful. This again was accomplished through the constructive imagination, was it not? Only by means of the constructive imagination could he form any sort of an idea of any particular planet, and each guess was an imaging of this planet pursuing a course that he had never seen it take. A child of one or two or three years listens daily to conversations between his mamma and papa. Sometimes consciously — always consciously or unconsciously — he is trying to understand them. How does he succeed in learning the meaning of so many words? Precisely, for the most part, as Kepler discovered the shape of the planetary orbits — by making a successful hypothesis. By the time he is three he knows how to use words that apply to purely mental processes — such as *know*, *think*, *believe*, *understand*. He thinks of — forms an image of — certain mental facts which he remembers in connection with certain words — brings images into a relation in which he has never experienced them, until he gets the right pair together — until he makes a successful hypothesis. Sometimes we can catch him in the very act of constructively ascertaining the meaning of a word. When a child of two speaks of the "skin of a book" through an act of inductive reasoning, he has concluded that the outside of everything is its skin — and this conclusion, to be a conclusion at all, must be imaged in part in his mind.

Evidently, therefore, the constructive imagination is not monopolized by poets and painters and novelists. Whoever reads, whoever listens to a conversation intelligently, whoever thinks — imagines, and imagines constructively. "There are indeed as many different kinds" — or rather cases — "of imagination as there are kinds of intellectual activity."

QUESTIONS ON THE TEXT.

1. Define *imagination*, *image*, *percept*.
2. What does a complete act of memory involve?
3. State and illustrate the difference between imagination and memory.
4. Illustrate the differences in the imagination of different people.
5. State and explain the quotation from Dr. Reid.
6. What is active imagination? Passive?
7. What is the difference between reproductive and constructive imagination?
8. How do we read a book intelligently, or understand a conversation?
9. How does a child come to learn the meaning of words?

SUGGESTIVE QUESTIONS.

1. What makes possible the difference between the active and passive imagination?
2. Give examples of cases in which children used words incorrectly, although reasoning in the same way as they did when they used other words correctly.
3. Compare the imagination of children with that of older people, and explain the difference.

LESSON XXVIII.

IMAGINATION.

(*Continued.*)

Scope of Constructive Imagination. — In the last lesson we saw that the imagination of popular thought differs widely from the imagination of which Psychology treats. When people in ordinary conversation speak of imagination, they mean a kind of constructive imagination — the kind that poets, painters, novelists, and musicians possess in an unusually high degree — the power of combining ideas or images furnished by reproductive imagination into new wholes, without having received suggestions as to the combinations from any one else. But it is now plain that we, who understand the poems, paintings, and novels that are the product of the constructive imagination, exercise constructive imagination. It does, indeed, require a higher power of it to combine images and groups of images originally than to do so under guidance, so much higher that some writers would give it another name and call it the creative imagination. But if we adopt their name we need to remember that the creative imagination of a Shakespeare, a Beethoven, a Thackeray, a Raphael, does not differ in kind from that of the child who imagines himself becoming a bird.

Differences in Constructive Imagination. — This enables us to see why great works of art — works which are the product of a high power of constructive imagination — often wait a long time to get their proper appreciation. Talk to a child about the pleasure of study, and he will not understand you. His experience has not furnished him with the material for comprehending what you say. His idea of happiness is the possession of cake and candy in abundance, and toys without stint. A little girl, who wished to show her affection for her mamma, urged her papa to get "a wheelbarrow and a dollie" for her mamma when he went to town; and when he came back without them she was deeply grieved. She built her notion of happiness out of the materials furnished by her own experience, and had no idea that it was not valid for every one. Some great writers seem to be so superior to even their most highly cultivated contemporaries in their power of constructive imagination that the latter can not think the thoughts of the former even under their direction. Beethoven's *Grand Symphony* was unintelligible to his musical contemporaries, and Newton's *Principia* was beyond the comprehension of the best mathematicians of his time. The intuitions of Beethoven and Newton, their perception of musical and mathematical truth, were so much more vivid and profound than those of their contemporaries that the products of their constructive imagination were unintelligible.

Constructive Imagination and the Feelings. — Constructive imagination is also very closely related to the feelings. We have already noticed two quite sharply contrasted cases in which constructive imagination works —

the case in which its products are controlled by the will, and that in which the will exercises no control whatever over the play of images. The products of passive imagination — as we may call the latter — plainly depend upon the feelings. Tell me the character of the images that habitually pass through your mind, and I will tell you what you like. As you can tell the tastes of a gourmand by noticing what he eats, so you can determine a man's likes and dislikes by knowing the images upon which he habitually dwells. This explains the very great influence of the feelings on belief. Only so far as the facts of the world and of life get *imaged* in our minds do they influence belief; and those that we *image* are, for the most part, those that it gives us pleasure to think of — those that it gratifies some part of our emotional nature to think of.

Relation between Imagination and Belief. — It follows that the exercise of the imagination may be attended with very grave intellectual results. The desire to imagine pleasant things may be stronger than the desire to imagine things that are true. All men of strong prejudices are examples of this. They are so anxious to believe a particular thing — find so much pleasure in picturing it in their imagination and thinking of it as real — that they will not fairly consider the arguments that make against their favorite theory. That is the reason why strong partisans only read the newspapers of their own party. They do not want to read both sides of the question. They only want to see their own side strongly supported, that they may have the pleasure of dwelling upon arguments that support the conclusion they have made up their minds to believe.

But the constructive imagination is often exercised for the sake of the feelings. When you build air castles, what are you doing? Exercising the constructive imagination — bringing before your mind images of what you would like to be real. Why do you do it? Because it pleases you. That is the reason why most people are so fond of reading novels. The events which the novelist enables them to picture please them more than the prosaic realities of every-day life. Sully has a paragraph on this subject that is worthy of careful attention. "The indulgence in these pleasures of the imagination," he says, "is legitimate within certain bounds. But it is attended with dangers. A youth whose mind dwells long on the wonders of romance may grow discontented with his actual surroundings, and so morally unfit for the work and duties of life. Or — what comes to much the same — he learns to satisfy himself with these imaginative indulgences, and so, by the habitual severance of feeling from will, gradually becomes incapable of deciding and acting — a result illustrated by the history of Coleridge and other dreamers." I read a story of a Russian lady which illustrates this. She went to the theatre, and wept freely over the imaginary sufferings of the hero of the tragedy; while the knowledge that her coachman was shivering in the cold on the outside waiting for her did not cause the faintest suggestion of pity. Of course, if we read novels not merely for pleasure, but for their interpretations of life — for the light they throw upon our relations to our fellows — such a "severance of feeling from will" can not follow. It is for teachers and parents to see to it that novel-reading serves its proper educational purpose — the purpose of broadening and strengthening the imagination, and preparing the

will for its proper work by giving the feelings that are excited by it an active direction.

Relation between Imagination and Action. — It follows from all this that what we will to do often depends upon constructive imagination. Men do rash things because they do not clearly realize the consequences of their conduct. Help a boy form the habit of clearly and fully realizing the probable consequences of his conduct — help him form the habit of realizing that the consequences of our acts depend not upon our wishes and intentions, but upon the nature of our acts — and you have gone a long way toward giving him the power and the habit of willing intelligently.

This brief survey of the relation of imagination to our mental life enables us to realize what indeed a consideration of its nature would have enabled us to see beforehand — that the part it plays in our mental life is of the very highest importance. Not reality, but what gets represented in our minds *as* reality — not what *is*, but what is *imaged* — affects our mental life. It is exceedingly interesting and instructive to note the naïve self-importance of a child — the belief, appearing in so many forms, that the world exists for him. The stern relentlessness of nature — the stoic disregard of our desires and wishes with which she pushes on to her own ends, trampling us under foot if we but cross her path — has not got imaged in his mind. And until it does, his attitude toward the world is precisely the same as though his thoughts were true. If, indeed, it is true — and is it not? — that all good causes depend upon the right training of the child, is it not evident what tremendous importance attaches to the right

training of the faculty that constitutes the audience-chamber in which Reality gets its only hearing?

Effects of Training the Imagination. — The accurate study of any subject is a training of the imagination, and yet there is scarcely one that does not tend to dispose the mind to be inhospitable to the images that represent certain phases of Reality. The specialist in mathematics is in danger of forgetting that not all reality is demonstrable; hints and suggestions and probabilities, that fall short of demonstration, he is in danger of despising. The specialist in literature is in danger of thinking of the attainment of truth as altogether too easy a matter. What did Shakespeare mean? What he — the student — finds in him. And he is in danger of being much too ready to project himself after the same fashion into the great Book of Nature, and get at the heart of her mysteries in the same easy way. The specialist in any branch of natural science is in danger of forgetting that there are any facts except those that can be weighed and measured, or that anything is worthy of belief that can not be proved experimentally The specialist in mind is, or rather was (it is scarcely true now that so much stress is laid on Physiological Psychology), in danger of undervaluing the methods of natural science — the methods that have so completely transformed the civilization of this century.

All this enables us to see that one of our great intellectual needs is breadth of culture, which is indeed, for the most part, but another name for that training which makes us disposed and able to give a fair hearing to all sides of Reality, and that we are in danger of missing it through too early specialization.

Imagination and Geography. — But while the various subjects mentioned above afford scope for the cultivation of the imagination, we shall, of course, bear in mind that the subjects especially adapted to its training in the public schools are history, geography, and reading. We should prepare to teach history in part by getting a thorough comprehension of the motives of the men who played a leading part in history; and we should endeavor to give our pupils such insight into their characters as to check the tendency to unqualified praise and blame. We should also try to give them the power to hold in their minds complex groups of facts, that they may see their relations to each other. In descriptive geography, we should try to leave in their minds definite and clear images of the countries they are studying. See the kind of knowledge of Tasmania Dr. Arnold wanted: "Will you describe to me the general aspect of the country round Hobart Town? To this day I never could meet with a description of the common face of the country about New York or Boston or Philadelphia, and therefore I have no distinct ideas of it. Is your country plain or undulating, your valleys deep or shallow, curving, or with steep sides and flat bottoms? Are your fields large or small, parted by hedges or stone walls, with single trees about them, or patches of wood here and there? Are there many scattered houses, and what are they built of — brick, wood, or stone? And what are the hills and streams like — ridges or with waving summits, with plain sides or indented with combs, full of springs or dry, and what is their geology?" Such a knowledge of the look of a country we want to get and give our pupils, and such knowledge can not fail to increase the power to form vivid images of things.

Imagination and Reading. — One of Mr. Galton's incidents will enable us to see the difference between the proper and the improper use of the imagination in reading. "I want to tell you about a boat," he said to a company one day, and, before proceeding further, he asked them to tell him what his words suggested. "One person, a young lady, said that she immediately saw the image of a rather large boat pushing off from the shore, and that it was full of ladies and gentlemen, the ladies being dressed in blue and white." It is unnecessary to say that that kind of imagination interferes with abstract thought. "Another person, who was accustomed to philosophize, said that the word 'boat' had aroused no definite image *because he had purposely held his mind in suspense.*" But if Mr. Galton had gone on: "The boat was a four-oared racing-boat, it was passing quickly to the left just in front of me, and the men were bending forward to take a fresh stroke," then his hearers should have formed a picture; and the more vivid, detailed, and exact the picture, the more completely the imagination would have subserved its proper function. In the teaching of reading, then, *discourage your pupils from forming definite images corresponding to general terms, but encourage them to form exact and detailed images corresponding to particular terms.*

Child Study and Imagination. — But there are other suggestions that I think we should get from this study of imagination. We have seen how universally active the constructive imagination is, and yet that it depends for its materials upon the reproductive imagination. We see, therefore, from a new point of view the necessity of making a careful study of our pupils. You would not hire a man

to build a house without furnishing the necessary materials. Be equally reasonable with your pupils, and do not expect them to build images out of nothing. Many a little boy or girl has an utterly erroneous idea of an ocean, because the teacher has not taken pains to dwell on the experiences the images of which would have made the required activity of the constructive imagination possible.

But with all the pains you may take, if you want to be sure that your pupils have performed the necessary acts of constructive imagination, there is but one way — by questioning. We are constantly talking to our pupils about matters that, by long reading and reflection, have become familiar to us. First comprehended with difficulty, they have become so simple that we forget how they looked when our minds got their first glimpse of them. We can hardly realize that what is so simple to us should be difficult to any one, and we never shall realize it save by everlasting questioning.

QUESTIONS ON THE TEXT.

1. Summarize the conclusions reached in the last lesson.
2. Contrast the ordinary ideas of imagination with that set forth in this lesson.
3. Why is it that the works of "creative imagination" are often beyond the comprehension of the age in which they were produced?
4. Show the influence of the feelings on constructive imagination, and of the constructive imagination on the feelings.
5. Account for strong partisanship.
6. What is "the severance of feeling from will"?
7. Show the place and importance of imagination in our mental life.
8. What is breadth of culture, and how can it be gained?
9. What uses should be made of the imagination in teaching history, geography, and reading?

SUGGESTIVE QUESTIONS.

1. Mathematicians and musicians to-day understand with ease Newton's *Principia* and Beethoven's *Grand Symphony;* account for the fact.

2. Make a study of the minds of the children you meet for the purpose of learning (1) what they have formed images of; and (2) to what an extent their images are due to their social surroundings, and to what an extent to the common impulses of childhood.

3. How would you try to cultivate a spirit of open-mindedness?

4. What subject in the public school course offers the best material for this purpose?

5. How would you try to prevent the severance of feeling from will?

6. Do persons who are "naturally suspicious" get pleasure from indulging in their suspicions, even when what they suspect is unpleasant?

LESSON XXIX.

CONCEPTION.

What the Mind Does in Conception. — The word "dog" evidently does not mean the same as "this dog." "This dog" may be a long-haired, long-nosed, long-eared black dog, with white spots on his back; while "dog" is the name not only of this dog, but of all dogs whatever. The same is true, of course, of all general names All general names are names of classes — names that are applicable to every individual of the class — while particular names, such as proper nouns and common nouns, limited by words like "this" and "that," are names that can be applied in the same sense to but one individual. How did the mind get this power — this power to use class-names intelligently? We never *see* a class;[1] we only see individuals. Classes do not make themselves known to us through any of the senses. How, then, does the mind form an idea of a class? To answer that question is to state what the mind does in conception, for conception *is that act of the mind by which it forms an idea of a class, or that act of the mind that enables us to use general names intelligently.*

[1] It is, of course, understood that I am using the word "class" to denote an indefinite number of individuals that resemble each other in certain particulars.

First Step towards a Knowledge of Things. — We have seen that our mental life begins with unclassified, unknown, indefinite, undifferenced sensations — that the first step towards a knowledge of things consists in the transformation of what we can only describe as vague feeling into definite sensations of this and that character. I say the first *step*. We must be careful to note that this transformation is not *finished;* a child does not become conscious of definite sensations of sound and taste before it *begins* to take the second step — before it begins to *localize* its sensations. We must think of this transformation not as an instantaneous process, but as a gradual change. A change in the direction of decreasing indefiniteness in sensations is undoubtedly the first change in the direction of knowledge of things, or, indeed, of any knowledge whatever. But before any sensation has the definite character our sensations now have when we attend to them, the child begins to take the second step — it begins to localize its sensations.

Second and Third Steps. — But here again we must note that this feeling of place may have very different degrees of definiteness. Even in our mature experiences we are sometimes conscious of sensations of pain without being able to locate them precisely, as when we have the toothache and do not know exactly which tooth aches. This process of localization, then, is at first a vague feeling of whereness; and before this vague feeling becomes a knowledge of a definite place — before the second step towards a knowledge of things has been fully taken — the third begins; the child's sensations are beginning to be grouped together and regarded as qualities of external objects.

In What does the Knowledge of Individuals Consist? — Let us suppose the three steps taken; let us suppose that a child has come to know a long-haired, long-nosed, long-eared black dog, with white spots on his back, to such an extent that, when asked where the dog is, he looks at him, and says "dog" when he sees him, as soon as he begins to talk. In what does this knowledge consist? In the fact that he has associated certain sensations of color with certain sensations of touch — those which he has received from running his hand over the dog — and both these with the name "dog." This is how it happens that when he sees or feels the dog he thinks of the name, and that when he hears the name he thinks of the dog. The sensations of color and touch, and the name "dog," have become so tied together by association by contiguity that one always brings the other to his mind.

But now we need to remember that the pair so tied together is, strictly speaking, not one pair at all, but an indefinite number of pairs more or less closely resembling each other. No matter who says "dog," whether papa, or mamma, or brother, or sister, or nurse, whether the word is pronounced in a high or low tone of voice, whether the speaker is one foot or ten feet away, the child thinks of "dog." But the sensation of sound in each of these cases is different. No matter where he sees the dog, whether in-doors or out; no matter what the dog is doing, whether eating or drinking, walking, running, standing, or lying down, the child recognizes him — thinks of his name. But the sensation of color in each of these cases is different. This looks like general knowledge to begin with. We are trying to learn how the mind forms general ideas — how it gains the power

to use general names intelligently. It looks as though it exercises this power even in knowing individual objects. The spoken word "dog" is itself the name of a large class of sounds; for, as we have seen, it is not only a different sound in the mouth of every different speaker, but in no two cases do they exactly resemble each other. The sensations of color, also, received from the dog are not the same sensations, but an indefinitely large class of more or less closely resembling sensations. The child, then, in recognizing the word "dog" whenever he hears it, and the sensations of color received from the dog whenever he sees him, seems to perform a mental act very much like recognizing any dog whenever he sees him; but that implies a knowledge of the class "dog"—implies, in a word, the exercise of the very power of conception we are trying to explain.

What does the Child Know First?—But are we not mistaken? Students of mind, from Aristotle down, have noticed that when a child begins to talk it calls all men "papa" indiscriminately. What is the explanation of this? It must be *either* that the child perceives the resemblance between other men and his papa, and applies the same name to them because of their resemblance—knowing, nevertheless, that they are different individuals—*or that he confuses every man with his papa, because he sees no difference between them.* If we accept the latter, we must say with Sir William Hamilton, that "in the mouths of children *language at first expresses neither the precisely general nor the determinately individual, but the vague and confused,*" and that this vague and confused idea, modified in one direction, becomes the definite knowledge

of an individual; modified in another, the definite knowledge of a class. "Papa," for example, would not mean to a child his own father, neither would it be the name of a class perceived to consist of different individuals, *but the name applied to resembling individuals not known to be different.*

In discussing this question, we must try to get at the heart of the matter; we must try to separate what is merely accidental and incidental from what is essential. What is the essential fact maintained? It is that the first knowledge which children have of the persons and things about them is not of persons and known things to be definite individuals, but of persons and things confused with each other, because of their resemblances. This may be true, and the contention of Aristotle and of many students of mind since his time — that children call all men "papa," for example, indiscriminately — may be false. Children begin to talk at quite different stages of their development. If the theory is true, we may expect, therefore, to see evidences of this confusion in the language of some children when they begin to talk, and not in that of others.

Reasons. — I believe that the first knowledge of children is of this character: (1) *because the mind perceives resemblances more easily than differences.* I know two brothers whom at first I could scarcely tell apart; now, I see that they are so unlike that it is hard to realize that I should ever have confused them. What is the explanation? *At first I saw resemblances only; not until I had seen them often did I note the differences between them.* Children's minds evidently work the same way. Ducks, geese, swans are all ducks to them. And we may expect them to show

as much less power in perceiving differences than we possess as their minds are less developed than ours. (2) *There are cases in which children unquestionably confuse different individuals, one of whom they know well, because of their resemblances.* Perez tells the following story of a child of thirteen months: "As one of his cousins was like his uncle, having the same sort of beard, and the same kind of figure and voice, the child treated him at once as an old acquaintance. He called him Toto (the name he had given to his uncle). . . . Seeing a pencil in his cousin's hand, he took it from him, put it in his mouth, and made with his lips the movements and sounds of a man who is smoking and puffing his smoke in the air. His uncle used to smoke. When he got down from the table he said, 'lou, lou, lou, lou,' in a tone of entreaty. This was explained to the cousin as signifying that he was to imitate the dog as his uncle was in the habit of doing to the child's great delight. Out in the garden the child made another request, which his cousin did not understand, much to the astonishment of the former, who was accustomed to being instantly obeyed by his uncle. . . . His cousin, having been coached up in his part, humored, as far as possible, all the habits which his uncle had made necessary to the child; but some he replaced by ways of his own; and the end of it was, that after being with his cousin three weeks the child afterwards expected from his uncle all the gestures, tones of voice, games, indulgences, and acts of obedience which the new *Toto* had accustomed him to."

What Makes the Perception of Individuals Possible? — Such facts seem to show that the first knowledge of

children is neither of individuals nor of classes. Not of individuals, because the child has only noted resemblances between things, or between the same thing seen at different times. *But the perception of individuals is impossible without the perception of differences.* Two men with exactly similar beard, same complexion, of the same size — exactly similar in every respect, and occupying the same position — would not be two men, but one. Two men also who seemed to be exactly alike in every respect would be regarded as the same person, however unlike they might be. Also, the first knowledge of children is not of classes, because, until they know individuals, they can not know classes, *since a class means and is nothing but a collection of individuals resembling each other in certain particulars.* But their first ideas of things are vague, confused ideas of resemblances between things not known to be different. To avoid circumlocution, we will call this idea a *class-image.*

QUESTIONS ON THE TEXT.

1. Trace the progress of the mind from indefinite sensations to the knowledge of external objects.
2. What kind of knowledge do children first gain of external objects?
3. Justify your answer.
4. State the case reported by Perez. What does it prove?

SUGGESTIVE QUESTIONS.

1. Report any cases similar to the one reported by Perez, that have come under your observation.
2. Have you noticed children calling other men "papa," and if so, did you notice whether they seemed to look upon them as strangers, or

whether their manner towards them was the same as towards their own papa?

3. Can you prove by your observation of children that they perceive resemblances more easily than differences?

4. Can you prove by your own experience that you do the same thing?

LESSON XXX.

CONCEPTION.

(Continued.)

Steps towards the Knowledge of Concepts. — Since a knowledge of class-images antecedes a knowledge of individuals, to explain conception we have first to explain how the knowledge of class-images externalized as things becomes a knowledge of definite individuals. Evidently the various steps or stages that mark the progress of the mind from those undifferentiated, indefinite sensations with which our mental life began to the formation of concepts are (1) the knowledge of class-images externalized as things; (2) the knowledge of individuals; and (3) the formation of concepts.

How a Knowledge of Class-Images Becomes a Knowledge of Individuals. — To see how the knowledge of class-images externalized as things becomes the knowledge of individuals, we must study our own experiences. Why did I confuse the two brothers mentioned in the last lesson? Because I saw no differences between them. It seems hard to realize that a child can see no difference between a large man with a full beard and a small one with none. But our powers of perceiving both resemblances and differences are much greater than a child's; and if I

could confuse two people whom I now see to be very unlike, we shall be able to realize that a child may see two very different things without being able to observe any difference between them. How did I finally gain the power to tell them apart? *By withdrawing my attention from them as wholes and fixing it upon individual features*—size, color of eyes, and the like. In precisely similar ways the child gains the power to distinguish individuals. And here we can see why it is so hard for him to acquire it. It is easy for you to withdraw your attention from objects as wholes and fix it upon parts or qualities, but it is very hard for a child. The individual features are there, but he does not see them because he does not attend to them. But little by little he gains the power to fix his attention upon individual features, and as he acquires it he gains a knowledge of individuals.

What Differences are First Noted?—When a child distinguishes individuals because he notes some of the differences between them, it is easy to see that he will first note only the most striking differences. The first difference that he notes between a big black dog and a small white one is probably a difference in color. The class-image of dog has become, on the one hand, the perception of individual dogs. Seeing no difference between them except in color, and noticing that they are both called dogs, he drops out of his class-image of dog the element of color, and associates what is left with the name "dog" whenever he hears it. *What is left of the class-image when the element of color is dropped out of it is a rudimentary concept, and the act of mind by which it is reached is conception.*

Steps in Forming a Concept. — Let us observe closely the steps that led from the percept of the individual to the concept of the class. The first step taken by the child towards the formation of the concept *consisted in fixing his attention upon both dogs, or upon one dog and an image of the other at the same time.* Let us call this first step *comparison.* The second *consisted in withdrawing his attention from the point of unlikeness — color — and fixing it upon their points of likeness.* Precisely as an essential step towards a knowledge of individuals consists in withdrawing the attention from the objects as wholes and fixing it upon individual parts or features, so an essential step towards a formation of concepts consists in withdrawing the attention from the points in which the objects compared are seen to be unlike, and fixing it upon those in which they are seen to be like. Let us call this step *abstraction.* The third step *consisted in applying the name "dog" to all other objects having the same characteristics — in making the name general by making it the name of a class.* Let us call this *generalization.* These three acts of the mind, then — comparison, or the fixing of the attention upon two or more objects at the same time; abstraction, or withdrawing it from some of their unlikenesses and putting it upon some of their likenesses; generalization, or the making of a name general by making it the name of all the individuals possessing similar qualities — are the three acts that constitute conception.

Concepts Liable to Change. — We see at once that the concept — the product of conception — is liable to constant change. The only difference that the child first observes between the two dogs is a difference in color. As he

observes them more and more carefully he notices more and more differences — the word "dog" means a smaller and smaller number of attributes. And when he hears the name applied to other animals he naturally puts them in the same class, and the meaning of "dog" is correspondingly reduced, although each separate act of abstraction is followed by an act of generalization — the extending of the name so reduced in meaning to all objects having the common characteristics he has observed.

But while a more careful and a wider observation of dogs in this way reduces the concept, it may enlarge it in another way. The child may notice points of resemblance before unobserved. In this way his concept is made to include more attributes — the class-name comes to have a richer meaning.

Definition of Concept. — From the point of view we have now reached we can see with some definiteness what a concept is. It was said above that a concept is the product of conception, and that conception is that act of the mind which enables us to use general names intelligently. This amounts to saying that we have a concept of a class when we can use the class-name intelligently, but as to what a concept is — we are left entirely in the dark.

If we carefully look into our minds when we hear or use a general term which we understand, I think we shall find *either no mental picture whatever corresponding to it, or else a mental picture with the feeling that a great many other mental pictures would serve the purpose just as well.* When any one speaks of "dogs," for example, in my hearing, I shall probably not form a mental picture of any dog

whatever. As I hear the word, a feeling of familiarity arises in my mind, a feeling that I know what is meant, and this feeling, *attaching itself to the word, constitutes my entire conceptual consciousness*, so far as that case is concerned. But if I do form a picture of some particular dog, I do it with the feeling that the picture of any other dog would do as well. In that event, this picture with the accompanying feeling constitutes my entire conceptual consciousness.

Voluntary and Involuntary Concepts. — The attention that results in comparison and abstraction may be either voluntary or involuntary, and therefore concepts may be formed voluntarily or involuntarily. We know from our study of attention that the concepts that a child forms in the first years of his life will, for the most part, be formed involuntarily because he is not able to give much voluntary attention.

How to Make Inaccurate Concepts Accurate. — Of course, concepts formed in this by-rule-of-thumb manner are indistinct and inaccurate. They are sure to contain attributes that careful observation would exclude, and not to include others that such observation would bring to light. But we must remember that it is exactly this kind of concepts that constitutes the furniture of a child's mind when he first starts to school. To transform these indistinct and inaccurate concepts into those that are distinct and accurate — to enlarge the number of concepts — is evidently an important part of education.

We shall be able to do this more intelligently if we remember not only the manner in which they are formed

but the condition upon which their formation depends. That condition is *the perception of resemblances between different individuals.* Until resemblances are perceived, no concept of the resembling objects can be formed. That is why a child finds it so hard to understand the meaning of numbers. Four horses, four cats, four toys, etc., resemble each other in being four, but they seem to the young child to have nothing in common — and therefore he does not know what you mean when you call them all fours. Not till his mind is able to detach the fact common to them all will he be able to understand you.

One of my students recently told me of a pupil to whom he could not teach numbers. The child was eight years old, and after persistent efforts to learn the significance of numbers would say, when asked how many cows there were in the field, seven or nine, for example, when she should have said three.

The difficulty in such cases is that the child has not formed the concept of numbers, the child has not seen that three dogs resemble three blackboards in one particular — in the particular of being three.

Until this resemblance is clearly seen, the attempt to teach the *names* of numbers must be utterly unavailing.

QUESTIONS ON THE TEXT.

1. Make a careful summary of the last lesson.
2. Define class-image. What is meant by "externalized as things"?
3. What is the first thing to be done in explaining conception, and why?
4. How does a child come to know individual persons and things?
5. State and explain the two directions in which the class-image is modified.

6. State and explain the three processes involved in conception.
7. What is the difference between percept, image, and concept?
8. In what two ways are concepts formed?
9. What kind of concepts has a child when he first starts to school?
10. Upon what condition does the formation of concepts depend?

SUGGESTIVE QUESTIONS.

1. At what age do children generally begin to understand the meaning of numbers?
2. Why is it desirable to use a variety of objects — sticks, straws, grains of corn, etc. — in teaching children to count?
3. Does this lesson throw any light on the question as to the proper age for taking up the study of grammar?

LESSON XXXI.

CONCEPTION.

(*Continued.*)

We saw in the last lesson that involuntary concepts are almost certain to be indistinct and inaccurate, and that when children first start to school, unless they have been carefully instructed at home, nearly all their concepts are of this kind. They have observed the objects they see about them closely enough to learn their names, and talk about them with a certain degree of intelligence. Because they can apply their names correctly, teachers are in great danger of thinking that the corresponding concepts are all that they need to be. But that is a mistake.

Words do not Convey Thoughts. — "While an external object may be viewed by thousands in common," said Professor S. S. Green, "the idea or image of it addresses itself only to the individual consciousness. My idea or image of it is mine alone — the reward of careless observation, if imperfect; of attentive, careful, and varied observation, if correct. Between mine and yours a great gulf is fixed. No man can pass from mine to yours, or from yours to mine. *Neither in any proper sense of the term can mine be conveyed to you. Words do not convey thoughts; they are not the vehicles of thoughts in any*

true sense of that term. A word is simply a common symbol which each associates with his own idea or image.

What Language Does.—"Neither can I compare mine with yours except through the mediation of external objects. And then how now do I know that they are alike; that a measure called a foot, for instance, seems as long to you as to me? My idea of a new object which you and I observe together may be very imperfect. By it I may attribute to the object what does not belong to it, take from it what does, distort its form, or otherwise pervert it. Suppose, now, at the time of observation we agree upon a *word* as a *sign* or *symbol* for the object or the idea of it. The object is withdrawn; the idea only remains—imperfect, in my case; complete and vivid in yours. The sign is employed. Does it bring back the original object? By no means. Does it convey my idea to your mind? Nothing of the kind; you would be disgusted with the shapeless image. Does it convey yours to me? No; I should be delighted at the sight. What does it effect? *It becomes the occasion for each to call up his own image.* Does each now contemplate the same thing? What multitudes of dissimilar images instantly spring up at the announcement of the same symbol!—dissimilar not because of anything in the *one* source whence they are derived, but because of either an inattentive and imperfect *observation* of that source, or of some constitutional or habitual defect in the use of the perceptive faculty."

How Inaccurate Concepts can be Made Accurate.—What, then, can we do to make these involuntary, and

therefore indistinct and inaccurate, concepts distinct and accurate? When a child starts to school, he attaches a meaning to *near*, *far*, *narrow*, and many similar words, but his concept of them is based entirely on his own observations, and is therefore very inaccurate. He has heard his parents talk about narrow ribbons, narrow boards, and the like, and if his teacher, without further illustration, tells him that an isthmus is a narrow neck of land, he will be sure to misunderstand her. Shall we seek to make his concepts accurate by definitions? No; for he can not understand our definitions unless he has accurate concepts corresponding to the words we use. We must get him to follow the path that leads to accurate concepts; we must get him to compare a large enough variety of near and narrow objects to enable him to apprehend the one common quality that such objects possess — we must get him to compare, abstract, and generalize.

Select Particulars Showing the Extreme Varieties. — But while it is necessary for us to bring the mind of our pupil into contact with particulars in order to make his concepts accurate, the very necessity of doing it shows the need of exercising care as to the kind of particulars you select. Why is a child's concept of *narrow* inaccurate? Because he has considered only certain kinds of narrow things — narrow ribbons, narrow paths, narrow planks, and the like. A young man told me that until he was eight years old he thought all rivers were like the one near his home. We see, therefore, the necessity of selecting particulars *that show all the extreme varieties.*[1]

[1] *See* Bain's *Education as a Science*, p. 92.

Those that Give Prominence to the Main Idea. — Begin also with particulars that give prominence to the main idea. If you are teaching your pupils what an island is, call their attention first to an island far from the mainland, in order that the characteristic quality of an island may be brought out prominently.

Select your particulars also solely with reference to the end in view. Do not select such as have an interest in themselves, because they attract the attention to features that are not included in the concept — features, therefore, that you wish the child to ignore.

Finally, stick to your purpose until it is accomplished. Accumulate particular after particular until the desired concept is formed, allowing yourself to be tempted into no digression whatever. Of course we should pursue the same method in developing new concepts.

Two Purposes Served by Language. — But in most cases our pupils have no names for the new concepts we help them to form until we give them. When should we give them? Evidently not until they need them. Language serves two purposes. In the first place, it enables us to preserve the results of our own thinking. When we have performed these processes of comparison, abstraction, and generalization — when we have formed a concept — if we did not give it a name, there would be nothing to fix it in our minds. When we associate a name with the concept, the name enables us to recall it without repeating the processes of comparison, abstraction, and generalization that in the first place enabled us to form it. But we have no use for general names to assist us in fixing concepts in our minds until we have formed the concepts of

which they are names. When we consider the other use of language, we are led to the same conclusion. The other use of language, of course, is to communicate ideas. As we have already seen, no such thing, strictly speaking, is possible. What you do when you are said to communicate ideas is to occasion your hearer or reader to recall ideas and make combinations of ideas similar to those in your own mind. This you are able to do by using a sign or symbol with which he has associated the same idea you have in your mind. Evidently, then, language can not be used to communicate ideas, or rather to occasion the recalling of ideas, until you have yourself associated a sign or symbol with the idea you wish recalled, and until your hearer has formed the same association.

Hence the absurdity of teaching words without ideas. Words are like paper money; their value depends on what they stand for. As you would be none the richer for possessing Confederate money to the amount of a million of dollars, so your pupils would be none the wiser for being able to repeat book after book by heart unless the words were the signs of ideas in their minds. *Words without ideas are an irredeemable paper currency.*

The Blind Use of Words the Fundamental Error. — It is the practical recognition of this truth that has revolutionized the best schools of the country in the last quarter of a century. Pestalozzi well called the blind use of words in matters of instruction the "fundamental error." He was not the first educational reformer who insisted on it. Montaigne, Comenius, Locke, Rousseau, had all insisted on the same idea, but they were in advance of their time; the world was not ready to listen to them. But in

1806, after Prussia was thoroughly beaten by Napoleon at the battle of Jena; when her capital city was in the hands of her conqueror, and she lay humiliated at his feet, it occurred to some of her leading men that the regeneration of the nation was to be sought in education. In this way it happened that the ideas of Pestalozzi were embodied in the schools of Germany, whence they have gone into the schools of every civilized country in the world.[1]

Pestalozzi's Reform. — In what did the reform inaugurated by Pestalozzi consist? *In the substitution of the intelligent for the blind use of words.* He reversed the educational engine.[2] Before his time, teachers expected their pupils to go from words to ideas; he taught them to go from ideas to words. He brought out the fact upon which I have been insisting — that words are utterly powerless to create ideas; that all they can do is to help the pupil to recall and combine ideas already formed. With Pestalozzi, therefore, and with those who have been imbued with his theories, the important matter is *the forming of clear and definite ideas.*

[1] It is to me a very interesting fact that Pestalozzi went to Paris early in this century in order to try to induce Napoleon to reform the educational system of France in accordance with his ideas. Napoleon said he had no time to bother his head with questions of A B C. Prussia took the time, and the result was that when Prussia and France met again on the field of battle nearly seventy years later, the soldiers of Prussia, educated in accordance with Pestalozzi's ideas, completely routed the armies of France.

[2] When I wrote this sentence I did not know that Pestalozzi had used a similar illustration: "The public common-school coach . . . must not simply be better horsed, . . . it must be turned round and brought on an entirely new road."

Object Lessons. — But how can such ideas be formed? By comparison, abstraction, and generalization, and by combining concepts so formed into complex concepts. That is why Pestalozzian teachers have made so much use of object lessons. Realizing that the only way the mind can form ideas of objects is by comparing them, then abstracting some quality, then generalizing, they have given systematic courses of Object Lessons in order that they might develop clear and definite concepts of objects in the minds of their pupils.

But systematic object teaching is not the only, or indeed the chief, way of teaching in harmony with this law of the mind. Object teaching — bringing the mind of the pupil into direct contact with the object out-of-doors, if possible, if not, in-doors — will be the method chiefly employed by intelligent primary teachers, because the great intellectual need of young children is clear and definite concepts of *objects*. Since all our concepts are either simple or complex, and since, of course, simple concepts must precede complex concepts, evidently the first step in education should consist in furnishing the mind with a stock of simple concepts. And since the mind of a child is for the most part employed with objects, since his interests lead him to direct his attention to the external world, plainly the thing to be done is to give him simple concepts of *objects*. But whatever the subject of thought, in order to get its simple concepts the mind must take the same path, pursue the same course, compare, abstract, generalize.

Objective Method of Teaching. — Whatever the nature of the facts studied, whether objects that can be brought into the recitation room, or those that are physically in-

accessible, or facts that can not be correctly described as objects, such as the facts of history, mental facts, mathematical facts, the intelligent teacher will lead his pupils to begin with an examination and comparison of them, then go on to note their resemblances and differences, then to make generalizations, unless he is sure that they have a stock of perfectly definite, simple concepts, by the combination of which they can form the complex concepts he desires. Such a method of teaching has well been called the Objective Method or Objective Teaching, since it is an application of the method of teaching by Object Lessons to every department of instruction.

QUESTIONS ON THE TEXT.

1. Make a careful summary of the two preceding lessons.
2. What are the two uses of language?
3. In what sense can we communicate ideas?
4. How can we make indistinct and inaccurate concepts distinct and accurate?
5. What kind of particulars should we select, and why?
6. In what did the reform inaugurated by Pestalozzi consist?
7. What is the difference between object and objective teaching?

SUGGESTIVE QUESTIONS.

1. What is the difference between simple and complex concepts?
2. Strictly speaking, can we have simple concepts of *objects?*
3. Mention as many distinct and accurate concepts that a child of six is likely to have, as you can think of.
4. What differences would you expect to find between the concepts of a child who has lived in the country, and those of a child who has lived in a city?
5. Talk with a child of six and endeavor to ascertain his concept of sky, star, sun, moon, and other objects inaccessible to him, that he hears mentioned in daily conversation.

LESSON XXXII.

CONCEPTION.

(*Continued.*)

What the Objective Method Is.—The great importance of the Objective Method of teaching inclines me to think that it will be well for us to spend a little more time in making an effort to get a thorough comprehension of it—such a comprehension as will enable us to use it from day to day. To this end, I venture to quote further from Professor S. S. Green. "The Objective Method," he says, "is that which takes into account the whole realm of Nature and Art so far as the child has examined it, assumes as known only what the child knows—not what the teacher knows—and works from the well known to the obscurely known, and so onward and upward until the learner can enter the fields of science or abstract thought. It is that which develops the abstract from the concrete—which develops the *idea*, then gives the *term*. It is that which appeals to the intelligence of the child, and that through the senses until clear and vivid concepts are formed, and then uses these concepts as something *real* and *vital*. It is that which follows Nature's order—the thing, the concept, the word; so that when this order is reversed—the word, the concept, the thing—the chain of connection shall not be broken. The word shall instantly occasion the concept, and the concept shall be

accompanied with the firm conviction of a corresponding external reality. It is that which insists upon something besides mere empty verbal expressions in every school exercise — in other words, expression and thought in place of expression and no thought.

"It is that which makes the school a place where the child comes in contact with *realities* just such as appeal to his common sense, as when he roamed at pleasure in the fields, and not a place for irksome idleness. It is that which relieves a child's task only by making it *intelligible* and *possible*, not by taking the burden from him. It bids him examine for himself, discriminate for himself, and express for himself — the teacher, the while, standing by to give hints and suggestions, not to relieve the labor. In short, it is that which addresses itself directly to the eye external or internal, which summons to its aid things present or things absent, things past or things to come, and bids them yield the lessons which they infold — which deals with actual existence and not with empty dreams — a living *realism* and not a fossil *dogmatism*.

The Objective Method Illustrated. — "It will aid any teacher in correcting dogmatic tendencies by enlivening his lessons and giving zest to his instructions. He will draw from the heavens above and from the earth beneath, or from the waters under the earth, from the world without and the world within. He will not measure his lessons by pages, nor progress by fluency of utterance. He will dwell in living thought, surrounded by living thinkers, leaving at every point the impress of an objective and a subjective reality. To him, an exercise in geography will not be a stupid verbatim recitation of descriptive para-

graphs, but a stretching out of the mental vision to see in living picture, ocean and continent, mountain and valley, river and lake, not on a level plain, but rounded up to conform to the curvature of a vast globe. The description of a prairie on fire, by the aid of the imagination, will be wrought up into a brilliant object lesson. A reading-lesson descriptive of a thunder-storm on Mt. Washington will be something more than a mere conformity to the rules of the elocutionist. It will be accompanied by a concept wrought into the child's mind, outstripped in grandeur only by the scene itself. The mind's eye will see the old mountain itself with its surroundings of gorge and cliff, of wood-land and barren rock, of deep ravine and craggy peak. It will see the majestic thunder-cloud moving up, with its snow-white summits resting on wall as black as midnight darkness. The ear will almost hear the peals of muttering thunder as they reverberate from hill to hill."

This long extract is worth all the study we can find time to put into it. The thorough comprehension and the practical appreciation of it will revolutionize our methods of teaching as completely as have been the methods of teaching in the best schools of the country in the last twenty-five years. But there are two or three sentences in it that are especially worthy of attention. Professor Green says that the Objective Method appeals to the intelligence of the child *through the senses until clear and vivid concepts are formed, and then uses these concepts as something real and vital.* What does he mean?

Real and Vital Concepts. — I said in the last lesson that whatever the nature of the facts studied, whether objects that can be brought into the recitation room, such

as coal, glass, water, and the like, or those that are physically inaccessible, such as are studied in geography or astronomy, or facts which can not be correctly described as objects, such as mental facts, historical facts, and the like, the Objective Method of teaching leads the pupil to begin with an examination of the facts; instead of beginning with inferences *about* the facts, it puts the pupil face to face with the facts, and leads him to make his own inferences. How is that possible when we are not dealing with objects in the immediate presence of the pupil?

When we are dealing with facts or objects that our pupils can not observe for themselves, we must develop in their minds, as nearly as we can, the same vivid ideas that would result from a careful observation of the reality. That is what Professor Green means in the sentence to which I have called your attention. A concept so vivid as to be something real and vital, is a concept that can be used in forming complex concepts of things only a little less vivid than would result from a first-hand observation of the reality. He means the same thing when he says that the Objective Method takes into account the whole realm of Nature and Art so far as the child has examined it; assumes as. known only what the child knows — not what the teacher knows. For so long as the teacher keeps within the range of the child's knowledge, the teacher presents simple concepts that the child can combine into complex concepts, which enable him clearly and vividly to realize facts and realities which are beyond the range of his observation, but which he can use in comparing, abstracting, and generalizing, as though he had seen them for himself.

When Professor Green says that the Objective Method

addresses itself to the eye, external or *internal*, he means to call attention to the fact that there are realities which can not be cognized by the senses, such as mental facts, but which, nevertheless, are to be studied in the same way.

First the Reality and then the Play of the Mind about the Reality. — This lesson enables us to see that one of the favorite doctrines of current pedagogy — first the idea, then the word — is inaccurate. In primary instruction it does indeed state with great accuracy the proper method of proceeding for the most part. But even here the teacher must sometimes violate it. No primary teacher can always confine himself to objects that have sometimes been within the range of the pupil's observation. He must sometimes take concepts formed from actual observation and build out of them concepts of realities that the pupil has never seen. A more accurate statement is, first the reality — the thing you wish your pupil to study — then the play of the mind about the reality. I use the somewhat indefinite phrase, "play of the mind," because a more definite expression would not be sufficiently comprehensive. In some cases, what you want from your pupils is not primarily intellectual action, or action of the knowing side of the mind at all. You wish to bring their minds face to face with a certain reality in order to excite the appropriate feelings. That, for instance, would be your object in teaching such a reading-lesson as the one described by Professor Green. The same is true, for the most part, in all teaching of literature. You wish to get the thoughts and sentiments of the piece in the minds of your pupils in order that they

may have the proper feelings — appreciation, admiration, and the like. In such cases in the maxim: First the reality, and then the play of the mind about the reality — "the play of the mind" means, for the most part, a certain activity of the emotional side of the mind.

But even when the play of the mind you seek to occasion is a certain activity of the intellect, the kinds of intellectual activity that the Objective Method aims at are so different in different circumstances that any very definite term will not accurately describe them. The play of the mind desired may be the formation of a concept — say the concept of roundness. In that case the reality consists of round objects. You call the attention of the child to round objects in order that he may fix his attention upon their shape, neglecting all their other qualities. Or the play of the mind desired may be the making of a definition — say a definition of roundness. Here the reality is his own concept of roundness; the play of the mind desired is the accurate description of that concept. Or the play of the mind wanted may be a description of a process — say the formulation of a rule in arithmetic. Here there are two sets of realities: (1) The conditions stated in the problem. You bring them clearly before his mind, in order that he may see for himself the path he must take in order to reach the solution. (2) Having solved the problem, you want him to describe the process, and this is the second reality. You want him to fix his mind upon it so attentively that he can give an accurate description of it.

In the following example the play of the mind desired is an inference from a fact. Your class learns from you or a book — so far as the Objective Method is concerned

it makes no difference which — that the Constitution of the United States forbade Congress to pass any law prohibiting the importation of slaves prior to 1808, and then that Congress passed such laws in 1808 — just as soon as the Constitution made it possible for them to do it — unanimously. You ask your class what they infer from that. They will be likely to say that it indicates that Congress wanted to do all it could to limit slavery. Without saying whether they are mistaken or not, you go on and tell them of the penalty Congress affixed to the violation of the law, and then call their attention to the fact that, although the law was constantly violated and everybody knew it, this penalty was very rarely inflicted, and then ask what that signifies. Here the reality is an historical fact, and the play of the mind about the reality that you are seeking to occasion is an inference based on the reality.

Why we may Fail to Apply the Objective Method.— If we have the clearest possible comprehension of the Objective Method, we may fail in our attempts to apply it, because we try to bring the minds of our pupils into contact with realities which they can not comprehend — try, in other words, to bring their minds into contact with realities with which they can not be brought into contact in their state of development. You could not give a blind boy an object lesson based on the sense of sight. No more can you intelligently use the Objective Method when the realities are beyond the range of your pupil's comprehension. And here we see another reason for making a careful study of our pupils: that we may learn what realities they can comprehend.

The Objective Method and the Herbartian Steps. — You have doubtless noticed the resemblance between the Objective Method, as I have here defined it, and the essential steps or stages in method as the Herbartians define them. But while they make four and sometimes five steps, I have noted but two. As will appear in the discussion of apperception, I agree with them in thinking a stage of "preparation" important. It is, as I shall endeavor to show, a very helpful means of getting "reality" before the mind of the pupil. Dr. De Garmo's term, "generalization," to denote what I have called "play of the mind," I object to, because it seems to imply that the action of your pupil's mind which you wish to occasion is in all cases intellectual, which is certainly not the case. I omit their final stage, application, not because it is not important, *when it can be taken, but in many cases it can not be taken.* Can you apply a feeling of admiration or appreciation as you can a definition, or a law or a principle to the cases that come under it? To illustrate: Take any poem, say, Gray's *Elegy in a Country Churchyard.* Why will you teach it? Do you want your pupils to infer from it some law or general principle which they can apply to their own observations and experiences? Or do you want the thoughts and feelings which the poet thought and felt to pass through their minds, in order that they may feel their beauty? The latter, I am sure, and such a feeling can not be applied. The very idea is absurd.[1]

[1] It doubtless has not escaped the attention of my careful readers that the Objective Method is based in part on laws of the mind which we have not yet considered. Those laws, however, are so generally known that I thought it would conduce to clearness to assume that they would be known, and discuss the Objective Method in connection with object teaching, which is but a single application of it.

QUESTIONS ON THE TEXT.

1. Give a general description of the Objective Method.
2. What does Professor Green mean by "real and vital concepts"?
3. Illustrate at length the formula, "first the reality, and then the play of the mind about the reality."
4. For what formula is it proposed as a substitute, and why?
5. Why may we fail in our attempts to apply the Objective Method?
6. Illustrate your answer from your own experience.

SUGGESTIVE QUESTIONS.

1. Is there any contradiction between the quotation made from Professor Green in this lesson and the one in the last?
2. Take any poem in your reading books, and decide to what extent the fourth of the Herbartian steps should be taken.

LESSON XXXIII.

JUDGMENT.

Summary of Mental Steps up to the Formation of Concepts. — We have seen that our mental life begins with undifferentiated sensations; that the first step towards knowledge consists in their gradual transformation into definite sensations; that while they are thus being made definite they begin to be localized; that before they are definitely localized they begin to be gathered together in groups and thought of as qualities of objects; that in the first stage of the perception of objects, only their prominent, salient features — those in which small classes resemble each other — are perceived, and that, therefore, individuals are confused with each other, not perceived as individuals; that the state of mind that results from the confusion of individuals — the class-image — gradually changes into two very unlike things, a percept and a concept; that, on the one hand, it becomes a percept through the definite perception of differences; on the other, a concept through the perception of resemblances between individuals perceived to be individual.

Through the greater part of these experiences the mind has been active in a way to which, so far, we have paid no attention. When we study so complex a thing as the human mind, we have to study its various phases or activi-

ties in succession; but we must remember that what we study successively exists contemporaneously.

Act of Judgment Illustrated. — We shall get a clearer idea of the activity of which I speak if we consider it first in a simple and very common form. I see a man coming down the street. At first I am uncertain whether it is John Smith or his brother. But as I look at him closely I notice a scar on his right cheek, just under his eye, and then I remember that John Smith once received a severe wound there. Immediately my mind passes from its state of doubt into a state of certainty; I say, That man is John Smith.

We may then denote the activity which we wish to study in a similar manner to that in which we denoted the activity of conception. As we said that conception is the activity of the mind that enables us to use general names intelligently, so we may say that judgment is the activity of the mind which is expressed in propositions.

Judgment is Sometimes Made Possible by the Laws of Association. — Manifestly such an act of the mind is rendered possible by the laws of association. Through the laws of association I thought of the name of John Smith and of his brother. But there is a wide difference between the final act of my mind and the simple result of the laws of association As long as my mental state is due entirely to the laws of association, I have a percept and two images in mind — the percept of the man before me, and the images of John Smith and his brother; but when I see the scar — when I am no longer in doubt — the percept and the image of John Smith are fused into one, and,

expressing this, I say, This man is John Smith. Such a mental act is called a judgment, and the words in which we express it are called a proposition.

Why the Judgment was Conscious. — If I had known the man was John Smith as soon as I saw him, it is evident that there would have been no conscious assertion expressed, or capable of being expressed, by the words, That man is John Smith. There was a conscious assertion, because there was, so to speak, a vacillation on the part of my percept. It stood midway between my image of John Smith and my image of his brother. Because I was conscious of this vacillation, I was conscious of my uncertainty, or rather *in* this vacillation my uncertainty consisted. But if, as soon as I had seen John Smith, the image of him as seen before had coalesced or fused with my percept, the act would have been so automatic that I should not have been conscious of it.

You can prove the truth of this by your own experience. As you went to school this morning, did you say or think to yourself, That is a tree, That is a house, That is a cow, as you passed these several objects? No, you merely recognized them — knew them directly — and were conscious of no mental assertion whatever. But suppose the cow had been wrapped in a buffalo robe, so as to look unlike any animal you had ever seen before. At a first glance you would not have recognized it. There would have been the same vacillation between your percept and the competing images that we have already observed in my experience. But when you had seen through the disguise, all but one of the competing images would have vanished; you would have performed a conscious mental

act that can only be described by a proposition — That is a cow.

When Conscious Judgments First Appear. — We can now see at what point in our mental life this conscious act first appeared. We have seen that a complete act of memory consists of retention, reproduction, recognition, and localization, and that memory begins to develop before imagination. Evidently, therefore, the mind recognizes things before it forms images of them when they are absent. Now this conscious act, which we have called judgment, first appears when there is an object before the mind of which it has a percept, *and when the mind is uncertain to which of two images to refer it.* If a child, familiar with oranges, sees a lemon for the first time, he at once classes it as an orange because of their likeness — there is no conscious act of judgment. But if he is familiar with both and the names of both, when he sees an orange at a little distance, by the law of association by similarity he may think of both an orange and a lemon — the image of both may arise in his mind — and his percept may vacillate between the two. When he gets nearer, and notices the peculiar shape and color of the object, he says, That is an orange. Evidently such a conscious act is not possible until the imagination is so far developed that two or more images arise in the mind in connection with the same percept, which the mind is not able to refer to either.

What Judgments Relate to. — If we examine the three judgments we have considered — expressed in the propositions, That is John Smith, That is a cow, That is an

orange — we shall see that they consist in the fusion or coalescence of two states of consciousness — a percept and an image in the first, a percept and a concept in the second and third. We need to note (1) that this fusion or coalescence is the way our thoughts *sometimes behave* when we pass from a state of doubt to a state of belief; (2) that although it is thoughts or states of consciousness that coalesce, *the belief does not relate to states of consciousness, but to some kind of reality.*[1] We do not say, "My percept of that object fuses with my idea of John Smith"; nor, "My percept of that object fuses with my concept of cow"; nor, "My percept of that object fuses with my concept of orange." *Though beliefs or judgments are rendered possible by states of consciousness, and though we may describe the states of consciousness in which judgments or beliefs consist, judgments do not, as a rule, relate to states of consciousness, but always to some kind of reality.*

Different Kinds of Reality Asserted. — The reality may be the reality of external nature, as when I say, That is an orange. Or the reality of literature. Thousands of books have been written upon the question of Hamlet's insanity. If I say he was insane, my proposition expresses a belief about a reality in literature. Or the reality of mythology. A student of the classics, on the way to recitation, is running over his lesson in his mind. He asks himself, How did Minerva originate? He is in doubt. Suddenly something brings the forgotten fact to his mind. He remembers that she sprang from the head of Jupiter. His memory is an assertion of a reality in mythology. Or

[1] *See* Baldwin's *Psychology*, p. 286.

it may be a reality of mental facts. I say, The concept man and the concept rational animal are one and the same. Here the reality asserted is a certain relation between mental facts.

Nature of Act of Judgment. — If we examine what takes place in our minds when we perform the judgment expressed by the proposition, Minerva sprang from the head of Jove, we shall see that there is no such fusion or coalescence between the thoughts that stand for the subject and predicate as takes place when we judge That is John Smith. The reason plainly is because of *the difference in the things asserted.* In the last case we assert identity. I see that the individual before me has all the characteristics of John Smith, because he *is* John Smith. In the first, we make an assertion about the origin of Minerva; we say not that she is, but that she sprang from, the head of Jove. So when I say, I dreamed last night, I make a still different assertion — I assert a different kind of fact. But no matter what we assert, we shall find, in the period of doubt that preceded the assertion, no fixed relations between the thoughts or concepts or states of mind that represent the various parts of the proposition that we finally assert. "I don't know whether that is John Smith or his brother." As long as I am in uncertainty, my percept tends now towards the image of John Smith, now towards that of his brother, according to my estimate of probabilities. When I pass from a state of doubt to a state of certainty, my percept assumes a definite and fixed relation towards the image of John Smith. "I don't remember whether Minerva sprang from the head of Jupiter or the head of Apollo." Here again there is

the same lack of definiteness and fixedness in the relations between the thoughts expressed by *Minerva*, *sprang from*, *head of Jupiter*, *head of Apollo*. But when I say: "I remember now — she sprang from the head of Jupiter," this lack of definiteness disappears; they are transformed into a new whole, or rather the first three are, each of them sustaining a definite and fixed relation towards the rest — a relation which they resume whenever I think of them, unless my belief changes.

Judgment Defined. — We see, then, not only that a judgment is that act of the mind which is expressed in a proposition, but we see what the act is. *It is the mental assertion of some kind of reality — the transformation or relating of separate units or elements of thought into one whole, in which each sustains definite and fixed relations to the rest.*

QUESTIONS ON THE TEXT.

1. State and illustrate what judgment is.
2. When do we make unconscious assertions, and why?
3. Under what circumstances do these unconscious assertions become conscious?
4. State and illustrate the various kinds of reality to which our judgments refer.
5. State and illustrate the difference (1) between the mere association of ideas and judgment, (2) between doubt and belief.

SUGGESTIVE QUESTIONS.

1. State the various causes to which, in your opinion, judgments are due.
2. Show that judgments could never have originated from the mere association of ideas.

LESSON XXXIV.

JUDGMENT.

(*Continued.*)

Difference between Association of Ideas and Judgment. — I said in the last lesson that there is a wide difference between the mere association of ideas and judgment. There is hardly an assertion in this book which it is of greater importance for you to verify at great length by a study of your own experience than this. Take proposition after proposition and make clear to yourself the difference between *merely associating the subject and predicate in your mind, and thinking them in the relation of a judgment.*

Suppose, for example, you should have a conversation with a man from the moon, and should explain to him the meaning of *water*, *quench*, and *thirst*, without showing him the relations which these facts actually bear to each other. When he thinks of the three at the same time, they have only a mechanical connection in his mind — the same kind of connection that exists in the mind of a child between the thought of a Chinaman and the thought of a steam-engine when the child thinks of the two at the same time because he first saw them together. But when *you* think of them together, you assert a real relation between the facts *water* and *thirst* — they are no longer mechani-

cally juxtaposed, *but parts of one logical whole, you think them in the relation of a judgment.*

Take also the proposition, "Napoleon conquered Europe." Do you not see the difference between merely thinking about "Napoleon," "conquered," and "Europe" at the same time, and thinking the judgment, "Napoleon conquered Europe"? The first might be possible through the association of ideas alone.

Essence of an Act of Judgment. — There is a conscious mental assertion only when this act of logical relating for some reason becomes a matter of attention. You say, That is a cow, only after you have been in doubt as to what animal you are looking at, or when you see it in some unexpected place, as in a public park. Some psychologists confine the term judgment to these *conscious* assertions of the mind. Assertions made unconsciously they refuse to call judgments, simply because they are made unconsciously. But assuredly those psychologists take the sounder position who hold that whenever thoughts assume that fixed and definite relation we have seen they have in a judgment, whenever they become parts of a logical whole, there is an act of judgment, whether the act is conscious or not. *The essence of an act of judgment consists in this logical relating of thoughts.* To refuse to call it a judgment because it takes place so rapidly and unobtrusively as to escape the eye of consciousness is to use language in a way that does not conduce to clearness of thinking.

Implicit and Explicit Judgments. — We may, indeed, properly enough mark the distinction between them by

putting them into different classes. We may call the judgments made unconsciously, implicit, and those made consciously, explicit. Evidently the mind made implicit judgments when it contemplated what we have called class-images. Evidently, also, when the consciousness of a class-image becomes the perception of an individual thing, the judgment is still implicit. And as every modification of a class-image in the direction of an individual is an act of implicit judgment, so every modification of a concept is an act of explicit judgment. If the first concept that the child makes of a rose is not of a rose as a rose, but as a plant, it is the result of an act of judgment — This is a plant. When he modifies his concept so as to make it include some of the attributes of a flower, this modification is still the work of a judgment — This plant is a flower. When he modifies it still further to make it include some of the attributes of roses, and then of that variety of roses called La France, it is still the work of judgment — This flower is a rose, this rose is a La France. In a word, the formation of a concept and each step in its subsequent modification is the work of the mind as judgment.

Different Kinds of Judgments. — Explicit judgments are usually classified according to the propositions used to express them. "This man is a lawyer," a categorical proposition, is said to express a categorical judgment. "This man is either a lawyer or a doctor," a disjunctive proposition, is said to express a disjunctive judgment. "If this man is a lawyer, he is not a doctor," a conditional proposition, is said to express a conditional judgment. But we can not ascertain the character of a judgment by

examining the proposition used to express it. *A categorical judgment is one in which the predicate is asserted of the subject absolutely and unconditionally.* Now, a categorical proposition may be the expression of that kind of a judgment, and it may not be. One man says, *The sun will rise to-morrow morning*, and his proposition expresses a categorical judgment — the possibility even that the sun will not rise has scarcely occurred to him. An astronomer says the same thing, but mentally qualifies his assertion — *If nothing happens to the earth or the sun to prevent it.* A metaphysician mentally qualifies the same assertion with the condition — *If things behave in the future as they have done in the past.*[1] The last two use a categorical proposition to express a conditional judgment. So, likewise, a conditional proposition may be used to express a categorical judgment. I say — *If he is a lawyer, he is not a doctor.* I mean, Men do not practice law and medicine at the same time, which is a categorical judgment. A child says, If I do not cry, mamma will give me candy — meaning simply that she will get the candy if she does not cry, and therefore her conditional proposition expresses a conditional judgment.

When we make a judgment about an entire class, our judgment is universal; when about a part of a class, it is particular. All trees have branches, is a proposition expressing a judgment about the entire class of trees; it is, therefore, universal. Some trees are green in winter, is a proposition expressing a judgment about a part of a class; it is, therefore, particular. Affirmative judgments are those in which something is affirmed; negative, those in which something is denied.

[1] *See* Lesson VI, also Baldwin's *Psychology*.

Judgments and Processes of Reasoning. — The common opinion is that the beliefs (judgments) of men — excepting those that we have called necessary truths and necessary beliefs — are based on processes of reasoning. Nothing can be more erroneous.

Children's Judgments. — The credulity of children is proverbial; but if we get our facts at first hand, if we study "the living, learning, playing child," we shall see that he is quite as remarkable for incredulity as for credulity. The explanation is simple: *He tends to believe the first suggestion that comes into his mind, no matter from what source; and since his belief is not the result of any rational process, he can not be made to disbelieve it in any rational way.* Hence it happens that he is very credulous in reference to any matter about which he has no ideas; but let the idea once get possession of his mind, and he is quite as remarkable for incredulity as before for credulity. A father was showing his little girl — three years old — a cistern, and she was looking at it with great interest, when she suddenly drew back, and cried out, in a frightened tone, "Oh, papa, you are going to put me in there!" and no amount of persuasion would induce her to consent to look at it again, *although the father had never threatened her with any kind of physical punishment, and there was absolutely nothing in her experience which would serve as a reason for her belief.* The explanation is that the idea occurred to her, and its mere presence in her mind was a sufficient cause for belief. The same child got in a passion of fear because her father playfully remarked, one day when he had a caller, that she must stay with him to keep the man from hurting him. Not anticipating any

such effect from his remark, he tried to soothe her by assuring her that it was not so, that he was only playing; but all to no purpose. *She did not believe it because he said it — because of her trust in him — and therefore she would not disbelieve it when he said it was not so.* Study your "elementary text-book," and you will find abundant illustrations of this truth: that belief about everything that comes within the range of a child's experience antedates reason; that what reason does, for the most part, in the early years of a child's life, is to cause him to abandon beliefs that are plainly at variance with experience.

Judgments of Uneducated Men. — If we study the larger child — the man with a child's mind — an uneducated man — we shall have the same truth forced upon us. If the beliefs of men were due to processes of reasoning, where they have not reasoned they would not believe. But do we find it so? Is it not true that the men who have the most positive opinions on the largest variety of subjects — so far as they have ever heard of them — are precisely those who have the least right to them? Socrates, we remember, was counted the wisest man in Athens, because he alone resisted his natural tendency to believe in the absence of evidence; he alone would not delude himself with the conceit of knowledge without the reality; and it would scarcely be too much to say that the intellectual strength of men is in inverse proportion to the number of things they are absolutely certain of. If this be true, it is hard to overestimate the importance of the work that education should do in this direction. How to make men believe what is true, how to keep them from

believing what is false, how to keep them from having opinions upon matters in reference to which their study and investigation, or rather the lack of both, give them no right to an opinion, is surely a question of the very greatest importance.[1] Manifestly the way to answer it *is to bring up* the rational side of the mind, to develop it and train it so that it may be strong enough to cope with the believing — judging — propensities of the mind. What we can do in this direction, therefore, it will be proper for us to discuss after we have made a study of reasoning.

QUESTIONS ON THE TEXT.

1. Make a careful summary of the preceding lesson.
2. What is the essence of an act of judgment?
3. State and illustrate the difference between explicit and implicit judgments.
4. What are the first implicit judgments?
5. How are concepts successively modified so as to include a larger and larger number of attributes?

[1] I do not, of course, mean to intimate that we should have no opinions about matters that we have not personally investigated. We take and ought to take the opinion of some men about law, and others about medicine, and others about particular sciences, and so on. But we should clearly realize the difference between holding an opinion on trust and holding it as the result of our own investigations. If we do, we shall see we have no right to an opinion at all — on trust — where there is a decided difference of opinion among specialists. If all I know about the appearance of a thing I have learned from the reports of two men, and if these are directly opposed to each other on all the essential points, then plainly I know nothing about it. In like manner, if I take my conclusions from specialists — as I must to be reasonable, when I have not studied the matter — then, when they disagree widely, there is no reason why I should take the opinion of one rather than another. I have, therefore, in such a case, no right to an opinion.

6. State the difference between categorical, disjunctive and hypothetical judgments.

7. Show that we can not tell the character of a judgment by examining the proposition used to express it.

8. Show that children often believe things because of the mere presence of ideas in their minds.

9. What are necessary truths and necessary beliefs?

10. In what did the wisdom of Socrates consist?

11. What lesson does this teach us?

SUGGESTIVE QUESTIONS.

1. Why is it important for us to believe what is true?

2. Have you observed beliefs in children that you could only explain by the theory stated in the text?

3. Have you observed a difference in children in this respect? Do some appear more ready to believe without reason than others?

LESSON XXXV.

REASONING.

Höffding on Children's Judgments. — We saw in the last lesson that children *tend* to believe the first suggestion that comes into their minds, no matter from what source. Some psychologists go much farther than this. Höffding, for instance, says: "It must be with dawning consciousness as with dream consciousness — all that offers is at first taken for current coin,"[1] since to such a consciousness there is no ground for a distinction between the world of possibility and the world of fact and reality. This argument is that, from the very nature of the mind, it follows that, in the beginning of its mental life, a child must accept its ideas or suggestions as true.[2] But we

[1] *Outlines of Psychology*, p. 131.

[2] That acute critic and profound student of human nature, Walter Bagehot, wrote a suggestive paragraph on this point: "In true metaphysics, I believe that, contrary to common opinion, unbelief far oftener needs a reason and requires an effort than belief. Naturally, and if man were made according to the pattern of the logicians, he would say: 'When I see a valid argument, I will believe; and till I see such argument, I will not believe.' But, in fact, every idea vividly before us soon appears to us to be true, unless we keep our perceptions of the arguments which prove it untrue, and voluntarily coerce our minds to remember its falsehood. 'All clear ideas are true,' was for ages a philosophical maxim; and though no maxim can be more unsound, none can be more exactly conformable to

have here nothing to do with such *a priori* reasoning. Our business is to make a patient study of facts; to carefully observe children, in order that we may learn whether there is a tendency to believe as true every suggestion that enters their minds; and if so, to what extent. But here, as always, we must guard against the propensity which, as we have seen, is such an active principle of human nature — the disposition to let our beliefs run clean out of sight of the facts upon which they are based, and assert a universal conclusion upon the basis of a few observations of two or three children. Knowing the influence of feeling on belief, one would naturally suppose that children would be more likely to show the tendency in reference to matters that excite their feelings. So far as my observations go, they tend to confirm the truth of this supposition. We should expect also that children of a decidedly emotional temperament would be more likely to show it than those of a quieter temperament. But plainly we have no right to an opinion on this point until we have observed a large number of children, or until we have carefully studied the results of competent observers.

Children's Reasoning. — But the child very soon begins to form judgments that we can put into quite a different class. When he sees a train coming, and runs into the house because he is afraid of it, his judgment, *The train will hurt me if I stay in the yard*, is the result of the

ordinary human nature. The child resolutely accepts every idea which passes through its brain as true; it has no distinct conception of an idea which is strong, bright, and permanent, but which is false too. The mere presentation of an idea, unless we are careful about it, or unless there is within some unusual resistance, makes us believe it."

mere presence of the suggestion in his mind. The suggestion, of course, is due to the association of ideas; the belief, however, is due, as we have just seen, to quite another cause. But when a child, who was burned by his soup yesterday, refuses to touch it to-day because he sees it smoking, his judgment, *The soup will burn me if I put it in my mouth,* is probably not to be explained in the same way. He does, of course, think of the possible burn because of the association of ideas, but he believes it because of a process that might be roughly described as follows: *Yesterday's soup smoked and burned me; therefore to-day's soup, which smokes also, will burn me. He makes a judgment about past experience the ground of a judgment about future experience; he goes from the known to the unknown.* A little boy once made the direct assertion, "Snow is sugar; for snow is white, and so is sugar."[1] *Because* snow and sugar are both white, he concluded that they are the same.

Reasoning Defined. — Let us see if we can find any judgment to serve as a basis or reason for the first one. Does the child think, *The train will hurt me if I stay in the yard because other trains have hurt me there?* or *because mamma told me it would hurt me if I stayed there?* No. He does not base the judgment on anything; he assumes it. He does not go from the known to the unknown; he assumes the unknown. His belief is not mediate — reached through other beliefs — but immediate. Now, the process of basing judgments on judgments — of reaching beliefs through beliefs — is called reasoning. *Reasoning, then, is the act of going from the*

[1] *See* Höffding's *Psychology*, p. 132.

known to the unknown through other beliefs, of basing judgments on judgments, reaching beliefs through beliefs.

Difficulty of Determining whether an Action is the Result of Reasoning or of the Association of Ideas. — It is often impossible to tell whether a given action has been performed as the result of a mere process of association, or of a genuine reasoning process. Take the case just mentioned of the child who refuses to touch smoking soup because he was burned yesterday. I have explained his action as due to a reasoning process. But is any other explanation possible? Certainly. It is altogether possible that the perception of the smoking soup to-day makes him think of the soup of yesterday, and that, of the pain he experienced, and that this thought of the pain causes him to refrain from eating soup to-day all through merely mechanical association. If his mental processes were as I described them above, then he reasoned. *But if his action is due to mechanical association alone, we can not describe his mental processes as consisting of a succession of related judgments, but of unrelated percepts and ideas which would have been judgments if they had been brought into certain definite relations with each other.* "Yesterday's soup smoked and burned; therefore to-day's soup, which smokes also, will burn me" — may be regarded as a rough description of his mental process *if he reasons.* But if he does not reason, percept of to-day's soup, thought of yesterday's soup, yesterday's pain — these one after the other without being brought into judgments — may be the elements in consciousness which precede his action. Even if he believes that the soup will burn him to-day — *because of his experience yesterday, but not because he sees any*

connection between the two, his mental process is not a case of reasoning. If he says, Smoking soup burned me yesterday, smoking soup will burn me to-day — if these two propositions accurately and completely express his conscious processes, he does not reason. But if he says or thinks, Smoking soup burned me yesterday, *therefore* it will burn me to-day, the action of his mind exhibits the distinctive characteristics of the reasoning process: he believes one proposition *on the ground of another;* he makes one proposition a *reason* for believing another.

A Story about Ants. — Such considerations put us in a position to form an intelligent opinion of some of the wonderful stories reported of animal intelligence. Take the story about ants which Romanes reports on the authority of an English clergyman: "I have noticed in one of my formicaria a subterranean cemetery, where I have seen some ants burying their dead by placing earth above them. One ant was evidently much affected, and tried to exhume the bodies; but the united exertions of the yellow sextons were more than sufficient for the disconsolate mourner."

The Action Explained. — In considering such an incident the first thing to do is to disentangle the facts from the snarl of inferences. What then are the facts, the *observed* facts? That the body of a dead ant was covered up, and that another ant tried to prevent it. Is there anything about this which requires to be explained as a reasoning process? By no means. Ants have a habit of removing anything that is in their way, and this habit — which is probably entirely due to instinct — explains their so-called burial of the dead ant. As to the grief of the

disconsolate mourner — how did the observer happen to learn the signs of grief in ants? I know when you are grieved. Why? Because you manifest it in the same way that I do — by the expression of your countenance, and so on. Did the countenance of the ant take on a sorrowful expression? Plainly the grief of the ant was an inference, and a gratuitous one at that. Granted that the ant attempted to prevent the so-called burial: did he do it *because* he was grieved or for some cause with which we are entirely unacquainted? The latter is surely the more reasonable supposition.

A Story of a Dog. — Professor James reports an incident of animal intelligence which would at once be set down by careless observers as a case of reasoning. "A friend of the writer gave as a proof of the almost human intelligence of his dog that he took him one day down to his boat on the shore, but found the boat full of dirt and water. He remembered that the sponge was up at the house a third of a mile distant; but, disliking to go back himself, he made various gestures of wiping out the boat, and so forth, saying to his terrier, 'Sponge, sponge, go fetch the sponge.' But he had little expectation of a result since the dog had never received the slightest training with the boat or the sponge. Nevertheless, off he trotted to the house, and, to his owner's great surprise and admiration, brought the sponge in his jaws."

The Action Explained. — Was this a case of reasoning? Not necessarily. The probabilities are that the owner's gestures and language suggested the sponge by mechanical association. If, as Professor James says, he had been un-

able to find the sponge, and had brought back a mop or a dipper it would have been clearly a case of reasoning. His actions in that case would have been due to a *perception* of the *relation* between the dipper and the use to which it was to be put — to the perception of the fact that for his owner's purpose *dipper and sponge were the same thing.* Such a perception could not be explained as consisting of mechanical association.

Reasoning from Particular to Particular. — If we examine our minds to see the course they take in the reasonings of every-day life, we shall find that we generally reason from some particular fact to some particular fact. You are going to take a train at half-past eleven, and you must give yourself ten minutes to go to the depot. You look at your watch; the hands indicate that it is fifteen minutes past eleven. Remembering that it was five minutes slow yesterday, you hurry off at once. Why? Because you believe it is twenty minutes past eleven, since your watch was five minutes slow yesterday. Because your watch was five minutes slow yesterday, you believe it is five minutes slow to-day; *you reason from a particular fact to a particular fact.* As you go out of the gate you notice threatening clouds in the west. You go back and get your umbrella, as you think it is likely to rain. *From the particular judgment, The clouds look thus and so, you go directly to the particular judgment, It is likely to rain.*

Deductive and Inductive Reasoning. — But suppose, in either case, I dispute your inference; suppose I say that it is only fifteen minutes past eleven, or that it is not likely to rain. You seek to justify your conclusion; you

fix your attention on the considerations that seem to you to prove it. You say, I have found by long experience that my watch is reliable, and since it was five minutes slow yesterday, I know that it is five minutes slow to-day. Or, you point to such and such characteristics of the clouds, and say, Clouds that look that way threaten rain. In the first case you seek to justify your inference from your conclusion by appealing to particular facts; in the second, by appealing to a universal proposition. Now that illustrates the difference between deductive and inductive reasoning. In either deductive or inductive reasoning the mind may start from particular facts. But when the mind retraces its steps in order to find the proof of its conclusion, it may find it *either* in a general proposition, *or* in particular propositions. In the first case the reasoning is called *deductive;* in the second, *inductive. Deductive and inductive reasoning, then, are not so much two kinds of reasoning as two modes of proof — two modes of exhibiting to ourselves or others the grounds of inferences already drawn.* When we prove a conclusion by a general proposition, the reasoning is called deductive; when by particular propositions, it is called inductive.

QUESTIONS ON THE TEXT.

1. What is *a priori reasoning?*
2. By what *a priori* reasoning does Höffding seek to show that children first hold all their ideas to be true?
3. Illustrate the difference between such judgments and reasoning.
4. What is the difference between inference and proof?
5. State and define and illustrate the two kinds of proof.

SUGGESTIVE QUESTIONS.

1. A child heard a servant say that a certain musical instrument was a harp; her mother afterwards told her that it was an harmonica, but she insisted that it was a harp. Explain it.

2. Give examples of the various cases of reasoning that have come under your observation during the day, and determine whether they are inductive or deductive.

LESSON XXXVI.

REASONING.

(Continued.)

Difference between Inductive and Deductive Reasoning. — We saw in the last lesson that the difference between deductive and inductive reasoning is rather a difference in the method of proving conclusions already inferred than a difference in the method of inferring them; that when we appeal to a universal proposition to prove our conclusion, the reasoning is called deductive; inductive when we appeal to one or more particular propositions.

Why does the same Method of Reasoning sometimes Lead to a True, and sometimes to a False Conclusion? — But how is that I am able to find the proof of a fact in particular propositions? When you say, "I know that this is a Maréchal Niel because I know that all the roses that have the characteristics of this rose are Maréchal Niels," if I disagree with you it is because I do not believe your premise. *Admitting your premise*, that all the roses that have the characteristics of this rose are Maréchal Niels, I must admit your conclusion. But when the child argues, "Sugar is white, snow is white, therefore snow is sugar," I admit his premises, but deny his conclusion. But when he argues, "This and that and the other unsupported

bodies have fallen; this stone is an unsupported body, therefore it will fall," I admit the truth of his conclusion. In both cases he argues from true particular propositions. We have to inquire (1) how he came to choose *those* particulars in order to prove his conclusion; and (2) how it happened that apparently the same method led, in one case, to a false conclusion; in the other, to a true one.

We Base Affirmative Conclusions on Likenesses, but never on Differences. — I think we shall see how to answer the first question if we ask ourselves if a child can believe that snow is sugar because the one is white and the other sweet. We know that he can not. We know that children — human beings in general — *reason from observed likenesses to unobserved likenesses, but never from differences to affirmative conclusions.* We know that the child argued that snow is sugar because *snow and sugar resemble each other in being white — because they belong to the class of white objects. The proof, in a word, that snow is sugar he found in the fact that both are white.* He took one white thing — sugar — to be the type of all white things — judged implicitly that all white things are sugar. He argued, then, that snow is sugar because it is one of the class of white things, all of which are sugar.

He selects the particular propositions, This unsupported object has fallen, That unsupported object has fallen, etc., to prove that the stone will fall if it is unsupported, for the same reason. Can he believe that a stone will fall because a robin flies, and a geranium bears blossoms, and a maple puts forth leaves in spring-time? Certainly not. These facts and the one he believes *do not resemble each*

other — are not members of a class. He believes that an unsupported stone will fall, on the ground that this and that and the other body have done so, because he takes this, that, and the other body as types of the class. He has made a class of unsupported bodies, and has judged that those he has observed are examples of the entire class. When, then, he reasons that the stone will fall if unsupported, because this and that and the other body have done so, *he really reasons that it will do so because all unsupported bodies will do so.* We see, then, that there is no essential difference between inductive and deductive reasoning. When I prove a particular fact by other particular facts, I do so because they are members of the same class as the one about which I am trying to prove something, and because I have already, explicitly or implicitly, reached a conclusion about the entire class. When a universal judgment is *consciously* appealed to, the reasoning is deductive; when it is unconsciously appealed to, it is said to be inductive; and that is the sole difference between deductive and inductive reasoning. I say, "I am going to die sometime." You ask, "Why?" "Because all men are mortal." There I appeal consciously to a universal proposition. If I reply, "Because this and that and the other man have died," I certainly appeal, perhaps unconsciously, to a universal proposition, since it is only because this and that and the other individual and I are members of the same class that what has happened to them throws any light on what is likely to happen to me.

We see, then, that we appeal to certain *particular* propositions to prove a fact, because they are included in a universal judgment that we have made.

All Inductive Reasoning is Deductive Reasoning. — Now, we see why the same kind of reasoning sometimes leads to a true conclusion and sometimes to one that is false. All inductive reasoning is deductive reasoning. When the universal implied by the particulars is false, the conclusion based upon it will be false. All white things are not sugar. Hence it is a mistake to say that snow is sugar because it is white. All unsupported bodies will fall. Hence I am justified in concluding that this stone will, because this and that and the other bodies have done so when I take them to be types of the class.

The proof in deductive reasoning may always be thrown into the following form called a syllogism:

(*Major premise.*) All white things are sugar;
(*Minor premise.*) Snow is a white thing;
(*Conclusion.*) Therefore, snow is sugar.

Why Able Men so often Differ. — We see here very plainly again that an act of reasoning may be altogether correct as a process, and yet lead to a false conclusion, because one of the premises is incorrect. That enables us to see why able men so often differ with each other; they start from different premises. Take the great differences you find between men in matters of politics, science — every department of thought — and you will often find that they rest at bottom on the fact that those who differ started from different major premises. A physicist or physiologist, for example, is very likely to believe that nothing can cause a change in matter but matter. If so, he is almost certain to be a materialist, since the changes in the body that we usually attribute to consciousness, he will attribute to the brain. His reasoning may be thrown

into the form of a syllogism: Nothing can cause a change in matter but matter. But consciousness is not matter. Therefore, consciousness can not cause a change in the body. A psychologist, on the other hand, may assume that nothing can have the characteristics that the mind has without having some of the attributes of a substance. If so, he will not be a materialist. His reasoning may be thrown into the following syllogism: Nothing can have such characteristics as the mind has without being a substance. But the mind can not be a substance if mental facts are mere phenomena of the brain. Therefore mental facts are not mere phenomena of the brain. One man says, "All measures that tend to promote home production are beneficial. A protective tariff does this; therefore a protective tariff is beneficial." Another says, "Undoubtedly your conclusion is true if your major premise is, but I deny your major premise. I hold that what promotes the interests of individuals promotes the interests of nations." Here we have an argument leading to a conclusion that directly contradicts the first, because it starts from a major premise that contradicts the major premise of the first argument. Compare the argument of Ex-Speaker Reed in the *North American Review*, January, 1890, with the reply of Senator Carlisle — the former defending the rules of the House of Representatives that had just been adopted by the Republican majority, the latter severely criticising them. Reed reasons substantially as follows: Whatever rules are necessary to enable the House to transact business are wise; the rules adopted by the Republicans are necessary to enable the House to transact business; therefore they are wise. Carlisle, on the other hand, reasons substantially as follows: Whatever

rules enable the Speaker of the House to exercise arbitrary and tyrannical power are unwise; the rules just adopted by the House enable the Speaker to exercise arbitrary and tyrannical power; therefore they are unwise.

Why Able Men Start from Different Premises. — If you ask how it happens that able men so often start from different premises, you ask a difficult question. One reason undoubtedly is, that the imagination, as we have seen, is the sole audience chamber in which Reality gets a hearing. If for any reason we do not image certain aspects or phases of Reality, they are for us as though they did not exist. The great majority of the facts to which the physicist habitually gives his attention are so well explained by his assumption, that it comes finally to seem like an absolute certainty — precisely as we are inclined to think it absolutely certain that things will behave in the future as they have done in the past. When he occasionally thinks of facts that seem to contradict his assumption, he refuses to believe them. That which is absolutely true can not be contradicted, however it may seem to be. Sometimes we refuse, more or less consciously, to consider but one side of a question. If we are interested in supporting a particular conclusion, it often happens that we will not look at the other side Members of debating societies generally come to believe that their side is right, whatever they thought at the start. They are looking for arguments on but one side, and they see no others. The Republicans in the House all voted for the Republican rules in 1889, and the Democrats against them. A few of both parties, perhaps, voted dishonestly, but I have no doubt that the great majority voted honestly. The Republicans were

interested in having their rules adopted, and looked for arguments to justify their course; the Democrats were interested in having them rejected, and looked for arguments to justify their course.

History abounds in illustrations of the effects of interest on belief.

Every one who has studied the history of Calhoun knows that a great change began to take place in his opinions about the year 1825. Before that time he had been an advocate of a protective tariff, a national bank, internal improvements, a liberal interpretation of the Constitution. About 1825 his opinions on all these questions began to undergo a change, and in a few years he had completely wheeled about. The explanation is, that about this time he had begun to see that slavery was the controlling interest of the South, and that the only constitutional weapon with which it could be defended was the doctrine of State rights. Under the influence of this perception the only facts that he permitted himself to realize (imagine) were those that supported his favorite doctrine.

Andrew Jackson's history abounds in illustrations of this kind. No man could be his friend and disagree with him. He was not only a very sincere patriot, but he was sure he was right, and therefore that everybody who disagreed with him was wrong. What seemed true to him seemed so self-evident that he could not understand how a man could honestly and honorably differ with him. His feelings not only determined his beliefs, but gave them such intensity that he could not conceive that any one could really doubt them.

The history of men like Alexander Hamilton and Jefferson gives still different illustrations of this truth. Because

of natural differences between the things they liked, they inclined to start from different premises in their political reasonings. Jefferson naturally trusted the people and believed in their political capacity, because of his optimistic temperament and because of his hatred of any form of government which made tyranny possible. Without Jefferson's optimism and Jefferson's hatred of a form of government which made tyranny possible, and with a strong love of order and stability, Hamilton as naturally believed in a strong government — one strong enough to hold the people in check — as did Jefferson in a weak one, because he did not think the people needed much governmental restraint.

Two Things to be Done in Training the Reasoning Powers of Pupils. — From this point of view, it is clear that there are two things to be done in the training of the reasoning powers of our pupils: (1) To train them to reason correctly from given premises; and (2) to give them such training as will diminish, as much as possible, the influence of personal considerations in selecting the premises upon which they base their reasoning — to give them such a love of truth that it will be able to neutralize the influence of all merely personal preferences and wishes. What we want to believe has a great influence on what we do believe, but it has no influence in determining what is true.

Calhoun and the South wanted to believe that slavery was right, and they did; but that did not make it right. In order to defend slavery, they wanted to believe that the doctrine of State rights was true, and they did; but that did not make it true. Their attempt to put it in practice, how-

ever resulted in one of the most fearful civil wars of which history gives us any account. Yet all that can be done, it seems to me, in the way of diminishing the influence of personal considerations in determining premises, is, in the first place, to point out the great danger of such influences. We have considered examples of such influences from history; you need not go to history to find them in abundance. Incidents at school, if you are on the lookout for them, will give you ample opportunity to bring home to your pupils the fact that there is great danger of their being led to believe this or that, not because a candid survey of all the facts shows that it is most probable, but because they wish to believe it. In the second place, we can set them a good example. I do not know how United States history can be taught profitably except by constant reference to current events. Mr. Freeman well says that "History is past politics and politics present history"; and the teacher of United States history should constantly try to illustrate "past politics" by "present politics," and show how "present politics" are the necessary results of the politics of the past. But to do this profitably — to do it without exciting the prejudices of his pupils — he must make it very evident that in all the questions he discusses, his supreme desire is to get at the truth. And he must really *have* that desire. In these and all other questions he should not only allow, but encourage, the utmost freedom of discussion. And when his pupils have pointed out an error in his reasonings — which they are sure to do sometimes — he should acknowledge it instantly, and thus show his supreme deference to truth.

QUESTIONS ON THE TEXT.

1. Show clearly the difference between inductive and deductive reasoning.
2. What is a syllogism?
3. Illustrate how it happens that able men so often differ with each other.
4. Illustrate the influence of interest on belief.
5. What can you do to train the reasoning powers of your pupils?

SUGGESTIVE QUESTIONS.

1. Give illustrations from your own observations of the influence of interest on belief.
2. Can you illustrate the same influence from current politics?

LESSON XXXVII.

REASONING.

(Continued.)

WE have seen that the only difference between inductive and deductive reasoning is that the one is based on an implicit and the other on an explicit universal.

We will now consider that kind of deductive reasoning that is usually called induction, and to avoid circumlocution I will give it the name that it usually bears.

Relation of Induction to Generalization. — Induction very closely resembles generalization. Generalization, you remember, is the last of the three processes involved in the formation of a concept. A child directs his attention to two or more objects at the same time — comparison — and after noting their like and unlike qualities, fixes his attention upon the former — abstraction — and thinks of them as the characteristics of a class — generalization. But there is no going from the known to the unknown, and, consequently, no reasoning in the act of generalization. When a child, noting that two or more objects resembling each other in a number of particulars, and all used to sit in, thinks of the qualities in which they resemble each other as the characteristics of a class — extends, in other words, the name given to them to all objects possessing similar qualities — he does not make an inference about

the objects he does not see. He does not say that since these chairs have this and that and the other quality, therefore all chairs have them — that would be an induction. But he says, Since these objects are alike in certain respects, I will make a class of them, and *if* there are any other objects that possess the same qualities, I will put them in the same class — call them by the same name.

Of course a child does not definitely think any such thoughts. We know that there is a great difference between what the mind really does and what it is conscious of doing. And when a child sees two objects and calls them dogs — thus putting them in the same class — and when seeing another dog, he says, "dog" — putting it in the same class — it is plain that his mind has taken the course I have endeavored to describe. This is generalization. But there is a wide difference between generalization (making a class of objects) and induction (concluding because one or more members of a class have such and such characteristics, therefore they all have it; or because something is true of one or more members of a class, therefore it will be true of all). In the one case, we are merely arranging objects into classes; in the other, we reason from one or more members of the class to the entire class.

From this it is evident that induction presupposes generalization. If in induction I reason from one or more members of a class to the whole class, I must have the idea of the class already formed in my mind.

We have already seen that inductive reasoning assumes that certain individuals are types of an entire class. Let us consider this further.

Two Assumptions Underlying All Inductive Reasoning. — When I reason that all crows are black because all the crows I have seen were black, I assume that the crows I have seen are types or examples of the entire class. This assumption that we can regard a greater or less number of individuals as types of a class clearly underlies a large part of our inductions, and we never can be quite sure in any case that we have a right to make it. Of course, it is more likely to be true when the instances which we assume to represent the entire class are very numerous. But, no matter how many cases we have examined, it will always be possible that some member of the class that we have not seen may be unlike those we have seen.

An hypothesis is an assumption that we make to account for facts. Our minds are of such a nature that we feel a certain uneasiness when we know a fact that we can not explain, and therefore it is natural for us to try to make some hypothesis or supposition to account for any fact we know. And since, of course, we do not make improbable suppositions to account for facts, or rather since we do not make suppositions that seem to us improbable, we are inclined to regard them as true, so long as they explain the facts. And this is another assumption upon which the greater part, if not all, of our inductions are based.

This assumption can not be so definitely stated as the preceding one. It would not be correct to state it in this form: An hypothesis which explains facts is true. For one great reason why people differ from each other so widely in their opinions is that of two hypotheses that equally well explain the facts, one seems true to one, and the other to another. A dozen men on a jury listen to the same evidence, and part of them base one conclusion upon

it, and the rest of them another. This is only another way of saying that one hypothesis that explains the facts seems probable to a part of them, and another to the rest of them. I do not believe that a more definite account of this assumption can be given than the following: We are naturally disposed to believe any hypothesis that does not seem improbable in itself, which explains facts for which we have, apart from it, no explanation.

Law of Parsimony. — It is evident that of two hypotheses, one which assumes a cause certainly known to exist, to account for the facts, and one which assumes an unknown cause, the former is the more reasonable. That is the reason why we are bound to account for the actions of animals by means of the hypothesis of mechanical association, *if we can.* Animals certainly do associate things mechanically. If, then, we can explain their actions by means of laws known to be in operation, we have no right to assume any other. That is the meaning of the law of Parsimony: Causes must not be multiplied beyond necessity.

Need of Care in Making Inductions. — Since we can not rid our inductions of an element of uncertainty, no matter how cautiously and carefully we frame them, it is evident that, unless we make them as cautiously and as carefully as we can, they are likely to have very little value. "I do not like Jews," says one. Get him to tell you why, and you will find that the reason is that he has known two or three Jews who were not pleasant persons. "It does not do boys any good to go to college," says another. "John Jones went to college, and he does not

know any more than Will Smith does" — as though an examination of the case of John Jones entitled one to an opinion of the whole class of students that attend college. "I do not like people with little noses," says a third; "they are always mean and stingy." The foundation for which is that he has seen one or two people with little noses who were stingy. Doubtless the great majority of the popular superstitions, "Thirteen is an unlucky number," "Bad luck to begin anything on Friday," etc., originated the same way. The best thing we can do to guard our pupils against such inductions is so constantly to call their attention to the necessity of founding their beliefs upon a wide basis of facts that they may get a realization of the danger of doing anything else.

How to Impress this upon Pupils. — Of course, the first condition of doing this successfully is that you have a vivid appreciation of the dangers of such inductions yourself. If you have such an appreciation, by encouraging them to express their opinions upon the various matters that come up, you can do something to develop such an appreciation in them. And when you are trying to develop it, first of all in your own mind, and then in the minds of your pupils, remember that the greatest foe of progress is Ignorance, and that the strongest friends of Ignorance are the dogmatism and prejudice to which careless and slovenly reasoning naturally give birth.

We have seen that when we appeal to a general proposition to prove our conclusion, the reasoning is called deductive; when we appeal to particular facts, inductive. When we try to prove one fact by appealing to another which is only valid to prove the one fact we have inferred,

so far as it has any validity, we are said to reason by analogy.

Argument from Analogy. — Argument from analogy is defined by Jevons as "direct inductive inference from one fact to any similar fact." The same author gives the following example: "Thus the planet Mars possesses an atmosphere, with clouds and mist closely resembling our own; it has seas, distinguished from the land by a greenish color, and polar regions covered with snow. The red color of the planet seems to be due to the atmosphere, like the red color of our sunrises and sunsets. So much is similar in the surface of Mars and the surface of the earth, that we readily argue there must be inhabitants there as here. All that we can certainly say, however, is that *if the circumstances be really similar, and similar germs of life have been created there as here*,[1] there must be inhabitants. The fact that many circumstances are similar, increases the probability. But between the earth and the sun, the analogy is of a much fainter character. We speak, indeed, of the sun's atmosphere being subject to storms and filled with clouds, but these clouds are heated probably beyond the temperature of our hottest furnaces; if they produce rain, it must resemble melted iron; and the sun-spots are perturbations of so tremendous a size and character that the earth, together with half a dozen of the other planets, could readily be swallowed up in one of them. It is plain, then, that there is little or no analogy between the sun and the earth, and we can, therefore, with difficulty form a conception of anything going on in a sun or a star."

[1] Italics are mine.

Uncertainty of it. — This kind of reasoning is more uncertain than inductive reasoning. Jevons speaks of the similarity between so many circumstances in the case of Mars and the earth as *increasing* the probability that the former is inhabited because the latter is, and at the same time says that "all we can certainly say is, that if the circumstances be really similar, and similar germs of life have been created there as here, there must be inhabitants." Need I say that in the very nature of the case we neither know nor can know anything about whether "similar germs of life have been created there as here," and that our knowledge of the extent to which circumstances are similar is so limited that any talk of probability is absolutely without foundation? All that the facts warrant us in saying is, that for aught we know Mars *may* be inhabited, but he who claims to be able to say that it probably is, lays claim to a larger amount of knowledge than falls to the lot of mortals.

QUESTIONS ON THE TEXT.

1. What is the difference between induction and generalization?
2. Show that induction presupposes generalization.
3. State and illustrate the two assumptions that underlie nearly all our inductions.
4. What is the law of Parsimony?
5. Define and illustrate argument from analogy.
6. What seems to you its logical value?

SUGGESTIVE QUESTION.

Give illustrations from your own experience of over-hasty inductions.

LESSON XXXVIII.

APPERCEPTION.

We have studied sensation, perception, memory, imagination, conception, judgment, and reasoning — all modes of intellectual activity. If we pass them in rapid review before us, we shall see that in all of them the mind is discriminating or noting differences, and assimilating or noting resemblances.

Assimilation and Discrimination in Sensation.—What is it to know a sensation? It is to discriminate or mentally separate it from all other sensations. A child has many sensations which it does not know; many sensations which it confuses with other sensations. But a sensation confused with other sensations is a sensation put in the wrong class — precisely as, if one were sorting out ribbons of different colors, the confusing of purple with blue would lead to the mixing of these two kinds of ribbons.

In Perception. — So likewise in perception. The first act of the mind in perceiving is to separate mentally the thing perceived from everything else. You remember that, in the lessons on Attention, we saw that what we perceive depends upon what we attend to. The mind in attention simply singles out the thing attended to from

everything else, and that is discrimination. A dog may stand before you, but if, through preoccupation or from any other cause, you do not discriminate it from the objects about it, you do not know it. Discrimination, however, is not all that is essential to knowledge. As a matter of fact, when we discriminate we usually know, because assimilation, or the act of putting a thing discriminated into a class, usually follows so closely upon the act of discrimination that the two seem to be identical. But they are not. To pick a piece of blue ribbon out of a scrap bag is one thing; to put it in a box with other blue ribbons is an entirely different thing. A child, seeing a dog, may discriminate it from all other objects, but until he perceives its resemblance to something else, until he assimilates it, he does not know it.

In Memory. — So likewise with memory. What is it to have a perfect recollection of any event? It is to have a definite knowledge both of the event and of the time when it happened. If the event is indistinct, it is not perfectly remembered, and its indistinctness is due to imperfect discrimination and assimilation. If we are in any doubt as to the time, it is because we do not perfectly discriminate it from other times, and do not perfectly assimilate it to other times. The event happened, say, at eleven o'clock yesterday, but I am uncertain whether it was eleven or twelve, or whether it happened yesterday or the day before — that is, I do not discriminate the hour and the day when it happened from all others.

Possibly you think that in this latter case there is no assimilation. Inasmuch as in any one place there is but one point of time known as eleven o'clock, April 26, 1890,

the question may be asked as to how it is possible for assimilation of such a fact to take place. The question can be readily answered if we bear in mind that the state of mind corresponding to the fact "eleven o'clock yesterday" is a complex concept. Before a child can know what is meant by "eleven o'clock yesterday," he must know the meaning of "yesterday" and "eleven o'clock," and this is possible only by discrimination and assimilation. But with the concepts of these two facts as elements, all that is necessary to the formation of the complex concept expressed by the phrase "eleven o'clock yesterday" is a synthesis of the two through the exercise of the constructive imagination. The product of constructive imagination is, of course, an image; but as we can take the image of red color to illustrate the concept color, so we can take any image to illustrate the corresponding concept.

In Conception. — We have seen that the three processes involved in conception are *comparison* — putting the attention on two or more objects at the same time, discriminating them from all other objects; *abstraction* — withdrawing the attention from their unlike qualities and fixing it upon their resemblances, assimilating them; and *generalization* — extending their name to all other objects having similar qualities — a further act of assimilation.

In order to judge, we must know the subject and predicate; and to do this, we must discriminate and assimilate them. I can not judge that oak trees lose their leaves in autumn unless I know what oak trees are, and what is meant by "losing their leaves in autumn." But to know oak trees, I must discriminate them from all other trees, and assimilate them to each other. The state of mind

corresponding to the fact "losing their leaves in autumn" is a complex concept; and to know its elements, as we have seen, we must assimilate and discriminate them.

In Reasoning. — The same is true of reasoning. When I say that John is a mortal, since he is a man and all men are mortal, my conclusion is the result of two acts of assimilation — the assimilation of John to the class men, and of these to the class mortals.

When I say that, since this and that and the other unsupported body have fallen, therefore all unsupported bodies will, I have perceived, in the first place, the resemblance between the unsupported bodies I have seen — I have assimilated them; and, in the second place, I have assimilated them to all other unsupported bodies.

Why so Many Kinds of Assimilation and Discrimination? — Since all knowing consists to so great an extent of discrimination and assimilation, how can there be so many different kinds of knowing? *Because there are so many different facts to be discriminated and assimilated.* The discrimination and assimilation of *single sensations* leads to the knowledge of sensations; of *groups of sensations* to the perception of objects which result in percepts; of *percepts*, to concepts; of *concepts*, to judgments; of *judgments*, to conclusions.

But does not this answer leave the really difficult point unexplained? Granting that there are different kinds of facts to be discriminated and assimilated, it is easy to see that they would issue in different products. But how is it that there are different kinds of facts? That is the really difficult question.

How do Psychical Facts Come to Be? — It may seem that to ask that question is like asking why there are so many different kinds of facts to be known in the universe. But it is not. Granted that there are things without, how do we come to know them? How does that which is *there* somehow get to be represented *here* in my mind? Granted also that I have lived — have laughed and wept and hoped and feared — have played a part as a conscious being in this strange world. But the past is gone, and with it its experiences. How is it that I am able to *re*collect them? How is it that that which was *there* and *then* somehow gets to be represented *here* and *now* in my mind? Granted also that there are real relations existing between real things, how am I able to assert them? That which gets into my mind is *mental.* How is the merely *mental* transformed into the non-mental, the subjective into the objective?

These, you know, are some of the questions we have been trying to answer, and they help us to realize what we are constantly in danger of forgetting — that our science, instead of having merely to discover the laws that govern ready-made facts, is to a large extent a science of processes — a science that has to discover how its facts come to be.

Sensations. — How, then, do the facts that we know as sensations come to exist? In the way already described — *characterless, indefinite, and undifferentiated experiences, but with latent likenesses and differences, begin to exist.* How these were transformed into definite sensations has already been explained. Here we have only to note that this transformation was the mind's own work; that what

we call a sensation is, in a sense, the product of the mind's own activity — that this activity converted latent likenesses and differences into a consciousness of likeness and difference between definite sensations.

Percepts. — How do percepts come to exist? By the mind's own activity. Sensations existing with certain spatial meanings come to be known as having those meanings. Through the native power of the mind to interpret the brogue of its sensations, to understand the meaning of their local signs, the mind arranges its sensations in space. and the result is a percept.

Recollections. — How do recollections of past experiences come to exist? Again by the mind's own activity. Our experiences succeed each other in time. That we know that they do results from the activity of our minds; the mind retrojects some of its images into the past through its interpretation of their temporal signs, precisely as it projects some of its sensations into space through its interpretation of their local signs.

Judgments. — How do judgments come to exist? Through the mind's power to apprehend the various relations of reality. *Day precedes night.* The mind apprehends it, and the result is a judgment. *Hamilton originated the financial policy of the Federalist party.* The mind apprehends it, and the result is a judgment. Judgments are the products of the mind's power to apprehend the relations of reality.

In each of these cases we have to note that it was no mere differentiation and classification of ready-made facts

that brought about the result. The mind makes its sensations, makes its percepts, makes its concepts, makes its judgments, and so makes possible their discrimination and assimilation.

Relation of Attention to these Mental Activities. — We know also the *condition* of these various activities. But it is only a condition. The activity of attention is no more to be confused with what results from it than light is to be confused with seeing. The best eye can not see in the dark, and the finest mind can not elaborate its products without attention; but light is not seeing, and attention is not the *fact-making* activity of the mind.

Apperception Defined. — We see also in what this activity consists. It is a *relating* activity — in sensation, bringing characterless experiences into relations of likeness and difference; in perception, combining sensations into relations of space; in memory, combining the various elements of experience into relations of time; in conception, combining percepts into relations of likeness; in judgment, combining percepts and concepts into the various relations of reality apprehended by the mind. If, then, we adopt the name usually applied to this activity and call it apperception, we see that *apperception is that combining activity of the mind that brings order and harmony into our mental life by transforming the consciousness of related facts "into the consciousness of relations."*[1]

Apperception, then — of which, indeed, discrimination and assimilation are modes — is the most fundamental

[1] *See* Baldwin's *Psychology*, p. 65.

form of mental activity. It makes sensations, and then, in the form of discrimination, separates those that are unlike and assimilates those that are alike; it discovers the space relations of sensations, transforms them into attributes of bodies, and then discriminates the objects so perceived that are unlike, and assimilates those that are alike; it discerns the time relations of mental facts, and transforms a succession of experiences into a consciousness of succession; it combines percepts into concepts, percepts and concepts into judgments, judgments into conclusions.

QUESTIONS ON THE TEXT.

1. Define and illustrate discrimination and assimilation.

2. Analyze sensation, perception, memory, conception, judgment, and reasoning, in order to show that in all of them discrimination and assimilation take place.

3. Psychology is to a large extent a science of processes — what is the meaning of that?

4. How does it happen that discrimination and assimilation issue in such different products?

5. Define apperception.

6. What does apperception do in sensation, perception, memory, constructive imagination conception, judgment, and reasoning?

7. What is the condition of apperception?

SUGGESTIVE QUESTIONS.

1. A child saw a donkey and called it a horse; a rabbit, and called it a cat; a fox, and called it a dog Why?

2. Report similar facts from your own observation.

LESSON XXXIX.

APPERCEPTION.

(Continued.)

In the last lesson we saw that perception, memory, imagination, conception, judging, and reasoning are processes of discrimination and assimilation, exercised on different materials, and that these different materials are themselves products of a more fundamental mode of mental activity, of which discrimination and assimilation are forms.

How can Knowledge Best be Imparted? — This being so, the question, How can I impart knowledge most clearly? may be put in another form. From the point of view we have now reached, we are able to see that the question is, How can I supply the conditions of apperception? or, to put it more definitely, though not so accurately, How can I enable my pupils to discriminate and assimilate most perfectly?

This activity of apperception in any of its forms *consists in the establishment of relation. If, then, a new fact is to be apperceived, it must be brought into relations with old facts.* The unknown must be related to the known. Now, in order that this may take place — in order that this relation may be established — it is not enough that

the mind have in the storehouse of memory concepts to which the known may be related; these concepts must be brought out; and the more completely the whole of one's past experience is ransacked for related concepts, the more perfect will be the apperception or assimilation.

We can easily illustrate the truth of this by appealing to our own experiences. Sometimes we read books to "inform our minds," or "to get general information"; sometimes to get definite answers to definite questions. Which do you find the more profitable reading? The last, I am sure; and the reason is that your whole knowledge of the subject to which your question relates is brought to bear on everything you find related to it. Your "apperceiving conceptions . . . stand, like armed soldiers, within the strongholds of consciousness, ready to pounce upon" everything they can bring within their grasp. Read the same book with no question in mind, and those apperceiving conceptions are like soldiers asleep, who let their enemy go by them undisturbed. You get illustrations of the same truth when you re-read a book after a considerable interval. If the book is thoughtful — worth re-reading — you are almost sure to find some suggestive or striking observation that escaped your notice the first time. I have read Bagehot's *Physics and Politics* many times, but I do not remember that my attention was ever attracted to the paragraph quoted some pages back until I read it a couple of weeks ago. When I read it before, I had "no receptivity" for it, either because I had no related concepts in my mind, or because they were in the background of consciousness, and therefore, like soldiers asleep, unserviceable. But when I read it two weeks ago, my attention had been attracted to the subject of the paragraph by my

own observations, and so my mind pounced upon it with great eagerness.

When you select a subject for an essay that interests you very much, three or four months before the time you expect to write it, your experience gives you illustrations of the same truth. You scarcely read a single newspaper, or a magazine article, or a novel, that does not suggest some idea on your subject. You suddenly become aware that there is a universe of thought as well as a material universe, and you find your subject "opening out" into it in every direction. Without that subject in mind, your reading would have had no such result; your apperceiving conceptions would have been asleep; their natural prey would have escaped.

Preparation. — These illustrations enable us to realize that the Herbartians are right when they say that "*the first great function of the teacher is to prepare the way for the rapid and efficient assimilation of that knowledge which the study hour or the recitation period is to furnish*," and that this function consists in causing "to appear in the consciousness" of the pupil "those interpreting ideas" that enable him to assimilate what is presented to him.[1]

Before the "presentation," then, of the matter of the lesson, the pupil's mind should be prepared for it. We have seen already how much the value of our reading is increased when we read to get a definite answer to a definite question. Let us bear this in mind when we are preparing the minds of our pupils for the apperception of

[1] De Garmo's *Essentials of Method*, p. 32.

concepts. Let us put a definite question before them which it is the aim of the lesson to answer.

When we have stated clearly the object of the lesson, we can help him still further by helping him to array in consciousness his apperceiving conceptions, so that he will be most fully prepared to accomplish the work. We see the connection between this lesson and some preceding lesson. We should recall the previous lesson to his mind; we should help him to bring out of the storehouse of his memory everything that bears on the lesson. We can, of course, do this most successfully by asking questions, because in this way we secure from him the greatest amount of mental activity.[1]

Presentation. — When in such ways the mind of the pupil is prepared for the efficient assimilation of the lesson, the matter of the lesson should be presented — the teacher, of course, requiring as much of this to be done by the pupil as possible. This subject of presentation has already been discussed in connection with the Objective Method. Presentation is nothing but a process of getting "reality" before the mind of the pupil.

Play of the Mind. — But we have seen that the "play of the mind" there spoken of is, for the most part, a form of apperception or assimilation. If we bear this in mind, we can better supply the conditions for it by bringing his mind into contact with those phases of the reality in question that present the most salient features for the activity of assimilation.

[1] See on this whole subject the book already cited.

Pedagogical Principle. — To this end, it will be useful for us to remember the following principle: "*Objects and wholes of any kind are more easily discriminated and assimilated — apperceived in general — than qualities and parts.*" The ground of it is evident. Objects and wholes of any kind differ from each other in more marked and striking ways than qualities and parts, and consequently can be more easily discriminated. Since they also resemble each other in a greater number of particulars, they can be more easily assimilated.

Proof. — You can prove its truth by appealing to your own experience. Which do you recognize more easily and certainly — your friends as wholes, or their individual features? Try to describe the features of your most intimate friends in their absence, and you will see. You will often find yourself ludicrously uncertain as to the shape of the nose, the color of the eyes and hair, to say nothing of less prominent features. All of us likewise recognize a rose when we see it, but it requires the training of the botanist to point out the qualities which distinguish it from all other flowers.

Assuming the truth of this principle, it is evident that we can best assist our pupils to discriminate and assimilate by presenting to them wholes and objects before parts and qualities.

Material Wholes and Thought Wholes. — We must not limit the application of this principle to *material* objects and *material* wholes. It applies to *thought* wholes as well. Indeed, strictly speaking, all wholes are *thought* wholes — wholes made by thought, wholes that are wholes

because the mind chooses to think of them as such. There is absolutely nothing in existence except the universe which we may not think of as a part if we choose, and absolutely nothing that we can not think of as a whole. The universe, including everything, can not be thought of as a part of anything else. Apart from that, it is *thinking*, and thinking only, which makes a thing a part or a whole.

Thought Wholes in Arithmetic. — Many arithmeticians do not keep this fact in mind. A fraction is often defined as one or more of the equal parts of a unit, as though units were things of fixed and unchangeable values. I divide an apple into four equal parts, and you ask me if one of these equal parts is a fourth. I do not know how to answer the question, or rather the question does not admit of an answer until it is made more definite. If you ask me what I call one of the parts in relation to the other three, I answer, a unit. It is *one* in relation to the other three, *two* in relation to eighths, *four* in relation to sixteenths, and *one-fourth* in relation to the apple. The apple itself is one-fourth when considered in relation to a group of four apples, one-eighth in relation to a group of eight apples, and so on. As the mind decides in what relations it will consider things, it is clear that all wholes, as such, are products of the mind. The reason why certain wholes, as apples, oranges, horses, dogs, etc., are thought of as wholes, in a special sense, is that the purposes of life and their relation to each other make it natural for the mind to consider them as such. If this is clear, we may say that a whole is anything, mental or material, that the mind chooses to regard as a whole.

In History. — Thus we may think of the life and public services of Alexander Hamilton as wholes. And, in accordance with the principle we have been discussing, the student will be best assisted in getting clear ideas of the life of that great man by having his attention called to its broad general characteristics first, before these are modified and qualified. If the student learns that Hamilton was first a Tory, then a Democrat, and finally a believer in a strongly centralized aristocratic republic, the broad outlines of Hamilton's political creed lie before him. The qualifications and specific description of these characterizations will put before him the changes in and final character of Hamilton's political creed with the utmost definiteness. So if your object is to give your class a clear idea of Hamilton's public services, first give them a clear idea of the great work of his life — the strengthening and centralizing of the general government; then they are ready for the details — the measures and influences by which these ends were reached.[1]

From the Known to the Unknown. — That we must proceed from the known to the unknown is another well-established rule in Pedagogy. It is hardly necessary to say that it is based on the fact that all knowing consists to so great an extent in discriminating and assimilating. When I learn a new fact — till then, of course, unknown — I put it in a class of already known facts.

From the Simple to the Complex. — That we must proceed from the simple to the complex, from the indefinite to the definite, from the unqualified to the qualified, is

[1] See on this subject De Garmo on Method-wholes.

another well-established pedagogical rule. What is its psychological basis? Plainly that a simple, indefinite, or unqualified fact or statement is more easily discriminated and assimilated than a complex, definite, or qualified fact or statement. If you are teaching a child the form of the outlines of South America, you will succeed best by ignoring its irregularities in the beginning. With the map before him, make him conscious of its general resemblance to a triangle or a ham of meat, or other familiar object, before you try to teach him how it differs in shape from them. If in such ways you fix the general outline in his mind before advancing to the details, you will impart clear ideas. And why? Because you are working in harmony with the laws of his mind.

There is a stronger resemblance between the outline of South America and a triangle than there is between it and any other simple figure, and if the child has a familiar knowledge of a triangle, he assimilates the general shape of South America as soon as his attention is called to it. Indeed, so far as *thought* is concerned, this case comes under the general principle already spoken of — wholes and objects are more easily discriminated and assimilated than parts and qualities. To *thought*, South America has the shape of a triangle — a whole — qualified by certain irregularities. In other words, just as the mind grasps a whole before it does the parts, so it grasps the triangle in South America before it does the deviations from a triangle. So likewise of the unqualified or indefinite in relation to the qualified or definite. In relation to thought, the unqualified and indefinite are wholes, first known as such before they are qualified and made definite, and the qualities are parts.

Application. — When we have put our pupil in possession of a concept, or definition, or induction, or maxim — we should, as the Herbartians insist, help him to vitalize his knowledge by helping him to apply it.[1] In teaching history, for example, we are constantly running upon some truth about human nature, or upon some law of economics or politics. To vitalize this truth, the pupil must be helped to see its relation to everything to which it applies within the range of his knowledge and experience.

Here we can see the educational value of "reviews" — it is to give to the student's knowledge that familiarity that makes it possible for him to relate it properly to new knowledge, and to use it in acquiring new knowledge.

Reviews. — Ordinary usage tends to promulgate the idea that reviews are useful only to fix things in the mind of the student in order that he can tell them. If they are only good for that, they are hardly good for anything. There are three stages of knowing. In the first, knowledge is merely implicit; the student can not express what he knows. Such knowledge is useful as a foundation for something better; but if it never leaves that stage, it is

[1] I can not agree with Dr. De Garmo and the Herbartians that this last stage or step always forms a part of a correct method. He holds that "(1) the apperception of new facts in *preparation* and *presentation*; (2) the transition from individual to general notions, whether the latter appear as definitions, rules, principles, or moral maxims; and (3) the application of these general truths to concrete facts, *i.e.*, the return from universals to particulars," are the three "essential stages of a correct method." I think that he makes this second step much too definite, as is evident from what I have said about "the play of the mind about the reality" in discussing the Objective Method. In some cases, as we have seen, "the play of the mind" is simply the appreciation of what is beautiful. How can such appreciation be applied?

almost worthless. In the second, it has become explicit; the student can tell what he knows, but he does not know it fluently enough, so to speak, to use it in thinking. In the third, the student not only knows, but knows so well that he can use his knowledge in thinking; he can use it in acquiring, and also in illustrating, new knowledge. Such knowledge is thoroughly assimilated; it has become a part, as it were, of the warp and woof, the flesh and bone and blood of his mind. To develop knowledge into that shape is the great function of reviews.

QUESTIONS ON THE TEXT.

1. Make a careful summary of the last lesson.
2. In what does apperception consist?
3. What light does it throw on the preparation of the pupil's mind for the lesson? Illustrate.
4. In what should such preparation consist?
5. Explain the principle that underlies the proper presentation of facts.
6. What is a thought whole? Illustrate.
7. Why should we proceed from the simple to the complex, from the known to the unknown, etc.?
8. What are the three "essential stages" of the Herbartians?
9. Criticise his statement of them.
10. What is the function of reviews?

SUGGESTIVE QUESTION.

Give examples of De Garmo's last stage, selected from geography, history, and reading.

LESSON XL.

NATURE OF DEVELOPMENT.

Summary of the Preceding Chapter. — We have now completed our survey of the so-called intellectual faculties. The last chapter has enabled us to see that this division of the mind into faculties is not a fundamental division — that, however convenient it may be to speak of perception, memory, imagination, conception, and reasoning as though they were distinct and separate powers of the mind, all of them are mere modes of apperception.

What the Training of the Faculties of the Mind Means. — In connection with the discussion of each of these modes of apperception, or faculties, as we may, to save circumlocution, continue to call them, we have considered the subject of their training. At this point, we may profitably consider the question as to what the training of these faculties means. Does the training of the faculty of observation mean the development of the power of observation in general? In other words, does the student who increases his power of observation by observing plants, increase his powers to the same extent — or even at all — to observe the facts of his mind? Does the student who cultivates his memory by the study of history

— his historical memory, we may call it — at the same time cultivate his geological or botanical memory? Does the student who cultivates his geographical imagination at the same time cultivate his mathematical imagination? Does the student who trains his reasoning power through the study of mathematics at the same time train it for the study of chemistry? In a word, are we to suppose that the exercise of our powers upon any subject matter trains them to an equal extent to deal with any other subject matter?

Symmetrical Development. — Students familiar with pedagogical literature have already seen that I am inquiring into the validity of a time-honored conception — the conception of symmetrical development. The ordinary conception of education is that it consists in symmetrical development, and by symmetrical development popular thought supposes such a development of the various powers of the mind as corresponds to their worth in the mental life. As reasoning is of more value than memory, it should receive more cultivation, but the cultivation which each of them receives is a cultivation good for any subject matter whatever. This is the conception the truth of which I am calling in question.

Huxley on Education. — We meet this conception in so clear-headed a thinker as the late Professor Huxley. "That man," he says, "I think, has had a liberal education who has been so trained in his youth that his body is the ready servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold logic-engine, with all its parts of

equal strength, and in smooth working order; ready, like a steam-engine, to be turned to any kind of work, and spin the gossamers as well as forge the anchors of the mind; whose mind is stored with a knowledge of the great and fundamental truths of nature, and of the laws of her operations; one who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heal by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of nature or art; to hate all vileness, and to respect others as himself."

Is Huxley's Opinion True? — Are there any men with intellects of this description ready, like a steam-engine, to be turned to any kind of work, ready to observe and remember any classes of facts, to imagine any phases of reality, to reason upon any subject with equal facility? With the possible exception of a few universal geniuses like Aristotle, Shakespeare, and Goethe, have there been any men capable of spinning the gossamers as well as of forging the anchors of the mind? If not, it is certainly a legitimate inquiry whether, in trying to reach an inherently impossible ideal, we are not losing valuable attainable goods.

I believe that the exercise of our powers upon any class of facts does not train them to the same extent for exercise upon any other class of facts; that you can say of the same man that he is a good observer and a bad observer, that he has a good memory and a bad memory, that he has great imaginative power and poor imaginative power, that he is a good reasoner and a poor reasoner, according as you have in view one subject matter or another upon which his powers are to be exercised.

Suggestions of Physiological Psychology. — I call your attention to the support which this proposition receives from Physiological Psychology. In our study of the brain we have learned that the functions of the cerebrum are to some extent localized, that the part of the cerebrum especially active in occasioning sensations of color is not the part especially active in connection with sensations of smell, and so on. What good reason, then, is there for supposing that a good observer of the colors of objects will be a good observer of sounds, or that exercise in one kind of observation has the same effect upon the mind as another? On the contrary, such a view of the facts suggests that we ought to speak of the mind's *powers* of observation, not power, precisely as we have seen that we ought to speak of the memories, rather than of the memory, of the mind.

Conclusions Drawn from Experience in Case of Observation. — When we study the effects of exercise in observation upon our minds and those of the people we know, we find the suggestions of Physiological Psychology abundantly confirmed. The sailor who can tell at a glance what line a steamship belongs to, and can detect land where you can not see anything, is a very poor observer when you get him on land; the jeweler who can tell with ease whether a stone is a genuine diamond, but who has no skill in distinguishing the qualities of silks; the wool-buyer who can tell the quality of wool from the way it feels, but who can not distinguish one quality of tea from another; the tea-taster who can discriminate the qualities of different teas with almost unerring accuracy, but who can scarcely distinguish one horse from another — are cases in point.

The expression, Such and such a man is a good observer, is always elliptical. It means that he is a good observer of certain classes of facts.

Memory.—We have already seen that the same is true of memory. We recall how Dr. Harris cultivated his memory for *dates*, and then for *names*—the cultivation of the one kind of memory was not the cultivation of the other. Every one knows that the man in whose memory certain kinds of facts "stick," apparently without effort upon his part, may remember facts in another department of thought only with great difficulty. The student who *can not* remember Latin and Greek forms may carry multitudes of chemical facts in his mind without difficulty, as one who can not remember mathematical formulas may remember psychological or historical facts with ease. How easily the story-teller remembers long-winded stories, or the practiced chess-player complicated positions on the chess-board, but it does not follow that either of them has a good memory for anything else.

Imagination.—We have seen that the same is true of the imagination. We remember that not only is it not true that the sort of training which the physicist gives his imagination in the study of his subject does not train his imagination to realize the facts of Psychology, but that in some respects such a training is a positive disqualification for it. Professor James reports an incident which illustrates in a very vivid way the effect of the study of biology on the *psychological* imagination. "I have heard a most intelligent biologist say: 'It is high time for scientific men to protest against the recognition of any such

thing as consciousness in a scientific investigation.'" The imagination of this biologist was so disqualified by his studies for apprehending the realities of consciousness that it seemed absurd to him to take any account of them at all! Each subject has its appropriate imagination, and the cultivation of the imagination by exercising it upon one subject matter is not the cultivation it would receive by exercising it upon another. Galton found that people in general society have as a rule much greater power to imagine in definite and vivid ways the things and events of ordinary life than men of science. The reason is that men of science are engaged for the most part in dealing with the images of symbols, and they therefore lose the power to form definite and clear-cut images of things.

Reasoning. — The same is true of reasoning. Every teacher knows how common it is to meet students who excel in one study, but who are below mediocrity in another. And biography is crowded with examples which show that excellence in one field is no warrant for inferring excellence in another. Charles Sumner, excelling as a statesman, but below mediocrity as a mathematician; Darwin, almost failing as a student of Latin and Greek, but with powers of reasoning in other fields which have placed him in the very front of the naturalists of the world; Sir William Hamilton, with powers as a metaphysician of the highest order of excellence, but with little capacity for mathematics — are cases in point. One may say indeed that one of the great characteristics of the nineteenth century is to emphasize more and more the value of expert knowledge. Who cares for a mathematician's opinion about currency, or for an economist's opinion about mathematics? Who

wishes to know what a clergyman thinks about geology, or what a geologist thinks about theology? President Eliot well says: "Confidence in experts, and willingness to employ them and abide by their decisions, are among the best signs of intelligence in an educated individual or an educated community." The reason is not only that expert *knowledge* is essential, but expert *reasoning*. In acquiring the knowledge of his specialty, the expert has acquired facility to reason upon it so that he is as much superior to the layman in a certain kind of reasoning capacity as he is in the possession of a certain kind of knowledge.

Truth Emphasized by the Notion of Symmetrical Development.—We seem justified in concluding, then, that there is no such thing as a universal training of perception, memory, imagination, reasoning. The notion of symmetrical development has played its part upon the educational stage. It is time for the curtain to drop upon it forever. That part has undoubtedly been useful. The idea of symmetrical development has helped us to remember that man is more than intellect—that a man whose intellect alone is developed has a poor education, no matter how well developed his intellect may be, as a man with a good deal of taste in some directions is likely to be a drivelling sentimentalist without a proper training of his intellect. A conception which has helped to keep such facts before our minds has rendered important service. It has also emphasized the fact that teachers have so much difficulty in remembering that the proper training of the intellect consists in something more than imparting knowledge.

Errors Suggested by it. — But it has also done a good deal of harm. Few educational experts to-day doubt that we require our pupils to study arithmetic at least twice as long as we ought. Why do we do it? *Because of the notion of symmetrical development.* With the idea that the study of arithmetic is especially adapted to train the reasoning power, we put our pupils at it when they start to school, and keep them at it until they enter the high school, and sometimes even longer. The same reasoning is used to justify the vicious extent to which our pupils are required to study technical grammar. I can not take time to point out the mischief which this mode of reasoning has wrought in high schools and colleges — to show the absurdity, for example, of requiring American citizens to study Latin, and not requiring them to study American history; of requiring them to study Greek, and not requiring them to study political economy; of requiring them to study higher mathematics, and not requiring them to study municipal government. Accept the theory that the training of the reasoning power upon one subject is to an equal extent a training of it to deal with any other subject — and such requirements are wise. Accept the theory that we acquire the capacity to reason upon any subject matter by actually reasoning upon that subject matter — and such requirements are absurd.

If, then, we must abandon the idea of symmetrical development as the criterion by which we are to be guided in the determining of courses of study, what shall be our guiding principle? This question I will try to answer in the following lesson.

QUESTIONS ON THE TEXT.

1. What is meant by the training of the faculties of the mind?
2. State Huxley's opinion on education.
3. In what particular was he mistaken?
4. What conclusion does Physiological Psychology suggest?
5. What conclusions can we draw from experience in the case of (*a*) observation, (*b*) memory, (*c*) imagination, (*d*) reasoning?
6. What truth is emphasized by the notion of symmetrical development?
7. What errors are suggested by it?

LESSON XLI.

THE END OF EDUCATION.

Herbartian Conception. — The question as to the criterion which is to guide us in selecting courses of study is the question as to the end of education. The Herbartians tell us that this end is character. Taken in the ordinary sense, as the equivalent of moral character, we all know that is not true. All of us are acquainted with men of character who are not educated.

Dewey's Definition of Character. — But I find myself obliged to dissent from the view that the end of education is the development of character, as character was defined at the recent (1897) meeting of the Herbart Society. Said Dr. Dewey: "Character means power of social agency, organized capacity of social functioning. It means, as already suggested, social insight or intelligence, social executive power, and social interest or responsiveness." In other words — according to Dr. Dewey — that man is educated who sees the needs of society, has capacity to promote them, and is disposed to do it.

It Regards Man Simply as a Member of Society. — Why not say, That man is educated who sees his own needs, — using the expression in the most comprehensive

sense, — has capacity to promote them, and is disposed to do it? If you say that the two definitions really mean the same thing, that they are descriptive of two sides of the same fact, I beg to dissent. *Dr. Dewey's definition regards man as simply a member of society; the definition suggested as a substitute regards man as an individual.* The ancient conception was that the end of man was to serve the state, and that the object of education was to qualify him for it. As it may seem at first sight that it makes no difference whether you state the end of education in terms that relate to the individual, or in terms that relate to society, so it may seem that it could not have made any difference whether the old Greeks stated their conception of education in terms that related to the state, or in terms that related to the individual. But when we find practices which we abhor defended on the principle that the individual exists for the state — practices such as slavery, the killing of feeble or deformed children, the treatment of barbarians as a race essentially inferior to the Greeks — it becomes evident that a conception which ignores the value and significance of man as an *individual* is not only false, but that it leads to pernicious practical consequences.

Difference between Dewey's Conception and that of the Ancient Greeks. — The difference between Dr. Dewey's conception and that of the ancient Greeks is that he puts "society" in the place of the state. As a man, according to the ancient Greeks, was nothing but a citizen, so, according to Dr. Dewey, he is nothing but a member of society. As the individual, according to the ancient conception, existed for the state, so, according to Dr.

Dewey, he exists for the sake of society. "He lives in, for, and by society." And as we have found pernicious practical consequences growing out of the notion that man was nothing but a citizen, so we shall find pernicious practical *proposals* based on the notion that man is nothing but a member of society.

Practical Deductions. — "As to methods," says Dr. Dewey, "this principle" — that man exists for society, and that the school should be a social community which reflects and organizes the fundamental principles of all community life — "when applied means that emphasis must be upon construction and giving out, rather than upon absorption and mere learning. We fail to recognize how essentially *individualistic*" — note the word — "the latter methods are, and how unconsciously, yet certainly and effectively, they react into the child's ways of judging and of acting. Imagine forty children all engaged in reading the same books, and in preparing and reciting the same lessons day after day. Suppose that this constitutes by far the larger part of their work, and that they are continually judged from the standpoint of what they are able to take in in a study hour, and to reproduce in a recitation hour. *There is next to no opportunity here for any social or moral division of labor.*[1] There is no opportunity for each child to work out something specifically his own, which he may contribute to the common stock, while he, in turn, participates in the productions of others. All are set to do exactly the same work and turn out the same results. *The social spirit is not cultivated — in fact, in*

[1] Italics not in the original.

so far as this method gets in its work, it gradually atrophies for lack of use."[1]

Criticism. — Would Dr. Dewey have the forty pupils read forty different books in order to make "a moral division of labor"? Would he have teachers set their pupils to work with a view to the needs of the individual pupils, or with a view to the needs of the school as a social community? Is the method which lays emphasis upon construction less individualistic than the method which lays emphasis upon absorption? Is the method which lays emphasis upon "giving out" good primarily because of its moral effects or because of its effect upon the intellect of the individual pupil? Is there any moral difference between "absorption" and "giving out"? Shall I set my pupils a task in which the emphasis is laid upon "construction" and "giving out," not because that sort of work is good for them intellectually, but because of its supposed moral advantages? Shall I sacrifice the intellectual good of my pupils for the supposed needs of the school as a social community?

Test of Good and Bad Methods. — The truth is, if the method which lays emphasis upon absorption is a bad method, it is not because it is individualistic, *but because it is not individualistic enough.* It deals too superficially with the individual. If the method which lays emphasis upon construction is a good method, it is because it has proper regard for the individual. The method which lays emphasis upon absorption is not a bad method because of its moral effects; nor is the method which lays emphasis

[1] *Third Year-book of the National Herbart Society*, pp. 15–16.

upon construction a good method because of its moral excellences.

The Proper Stimulus.—Dr. Dewey says that the absorptive method inculcates "positively individualistic motives and standards." "Some stimulus will be found to keep the child at his studies. At the best this will be his affection for his teacher," etc. Why not interest in his work? Does not every teacher know that this is the motive to which we must successfully appeal if we are to get the best results? "But unfortunately the motive (of affection for the teacher) is always mixed with lower motives which are distinctly individualistic." Fear enters in, "the fear of losing the approbation of others; fear of failure so extreme and sensitive as to be morbid. On the other side, emulation and rivalry enter in. Just because all are doing the same work, and are judged (both in recitation and in examination, with reference to grading and to promotion) not from the standpoint of their motives or the ends which they are trying to reach, the feeling of superiority is unduly appealed to."

Dr. Dewey on Promotion.—If the last sentence means anything, it means that pupils are to be graded and promoted not according to their capacity to work, but from the standpoint of their motives! A boy is to be promoted from one class in arithmetic to another not because he is able to do the work in the advanced class, but because of the high moral purpose that animates him! And how is it that Dr. Dewey has failed to see that fear of failure to do constructive work may likewise be morbid; that emulation and rivalry may as easily step in in connection with

that kind of work as in connection with any other? *The natural incentive to study is interest in the work done.* Whoever relies upon any other motive relies upon a comparatively artificial motive. These two propositions, it seems to me, are self-evident: (1) When I set a pupil a given task, I ought to have in view his entire needs as an individual, and not as a member of society simply; (2) such work gives him the best stimulus to work because it is best fitted to arouse his interest.

Contrast between the Needs of a Pupil as an Individual, and his Needs as a Member of Society. — If it be said that I am drawing a contrast where none exists, the contrast between the needs of the pupil as an individual, and his needs as a member of society, I reply in the first place that I am simply following Dr. Dewey's example. It is he who suggests that pupils shall be graded and promoted not according to their capacities — their needs as individuals — but according to their needs as members of society. In the second place, I am unable to believe that the needs of the pupil as an individual, and his needs as a member of society are identical. Is not the pleasure which a student feels in study one thing, and is not the pleasure he experiences as he reflects upon the service which knowledge of the subject will enable him to render to his fellows another? Is not the perception of the beauty of a landscape, or a flower, or a picture, or a poem one thing, and is not the social use and consequence of that perception a different thing? Should we try to help our pupils appreciate the beauty of nature and art for their own sakes as individuals, or for the social uses and consequences of such perceptions?

If it were true that the needs of the pupil as an individual and his needs as a member of society coincided, I should still protest in the interests of right thinking against Dr. Dewey's putting of the question. On that supposition, it is surely more rational to say that the ultimate reason for the work which we require of pupils is that by doing it they promote their own highest ends. For unless the pupil has felt the value and significance of his own life as an individual, how can he be expected to feel the value and significance of the lives of the individuals who compose society?

The Individual the Thing of Supreme Value. — As I conceive it, the Herbartian conception ignores the truth which all history has been struggling to teach — that the thing of supreme value and worth in this world is the individual. What can you do for the individual? is the question which we should put to schools, churches, forms of government — institutions of every description. Not the man for the state, as the old Greeks taught, but the state for the man; not the man for the Church, as the Middle Ages taught, but the Church for the man; not the pupil for the school, as Dr. Dewey teaches, but the school for the pupil.

If, then, we must reject the notion that the end of education is symmetrical development, and the Herbartian conception, that it is the development of character, what shall we take as our goal?

Preparation for Rational Living the Object of Education. — Perhaps it is impossible to answer this question more definitely than by saying that the object of education

should be preparation for wise and rational living; complete living, Rousseau and Herbert Spencer have called it, wise and rational living not only in society, but in all the relations of life. Many people suppose that the object of education is the communication of knowledge. Manifestly that is a part of education. For how can I act wisely without knowledge? How can I take proper care of my health without some knowledge of hygiene? How can I train my child intelligently without some knowledge of Psychology? How can I vote intelligently without some knowledge of economics and history? How can I render these services to society upon the performance of which my livelihood depends without knowledge? Popular thought errs, therefore, by taking a part of the truth for the whole.

And the same is true of the Herbartian conception. All of us are members of society. A part of our lives is as members of society. But a man prepared to live wisely and rationally as a member of society only, would not be prepared for complete living; he would not be prepared to live wisely and rationally in *all* of the relations of life.

Elements of it. — What constitutes preparation for rational living? Not *social* insight, *social* executive power, and *social* interest or responsiveness simply, as Dr. Dewey supposes, but insight into my own needs, and those of society in so far as it is related to me, ability to act accordingly, and the disposition so to act. In other words — the possession of a certain kind of knowledge; a certain discipline of the intellect; a certain responsiveness of the emotions; a certain training of the will. I must have knowledge; I must be able to make the proper application

of my knowledge; I must be disposed to do it; I must be able to act on my disposition.

(1) The Possession of a Certain Kind of Knowledge.—(1) *The possession of a certain kind of knowledge* What kind? That which bears on action and legitimate enjoyment. Whatever I need to know in order to act wisely and enjoy rationally the pleasures of life, my education should have taught me, or put me in a position to acquire.

(2) Of a Certain Discipline of the Intellect.—(2) *The possession of a certain discipline of the intellect.* Dr. Dewey insists on the importance of constructiveness in contrast with mere absorption, and wisely, though for an unwise reason. Constructiveness and thought are essential, because without them our pupils will not acquire the power to make a wise use of their knowledge. Without proper knowledge we can not act wisely, without ability to draw the proper inferences from our knowledge and make the proper applications of it we are equally incapable of wise action.

(3) Of a Certain Responsiveness of the Emotions.—(3) *A certain responsiveness of the emotions.* Our emotions constitute what I may call the worth-giving side of our natures, that side of our nature which determines our estimate of things. Now, as Davidson says, "it is not enough for a man to understand the conditions of rational life in his own time, he must likewise love these conditions, and hate whatever leads to life of an opposite kind. This is only another way of saying that he must love the good and hate the evil; for the good is simply what conduces

to rational or moral life, and the evil simply what leads away from it. It is perfectly obvious, as soon as it is pointed out, that all immoral life is due to a false distribu tion of affection, which again is often, though by no means always, due to a want of intellectual cultivation. He that attributes to anything a value greater or less than it really possesses in the order of things has already placed himself in a false relation to it, and will certainly, when he comes to act with reference to it, act immorally," and, therefore, unwisely.

(4) **Of a Certain Training of the Will.** — (4) *A certain training of the will.* "But again it is not enough," Davidson continues, "for a man to understand correctly and love duly the conditions of moral life in his own time; he must, still further, be willing and able to fulfill these conditions. And he certainly can not do this unless his will is trained to perfect freedom, so that it responds, with the utmost readiness, to the suggestions of his discriminating intelligence and the movements of his chastened affections."[1]

Respect for Expert Knowledge. — There is one characteristic of a man prepared to live wisely in our democratic country of such overriding importance that I can not omit to mention it, the less so as I may seem to have fallen into the same error which vitiates Spencer's reasoning in his essay on "What Knowledge is of Most Worth," the mistake of supposing that the individual ought to be taught all that the society of which he is a member needs

[1] Davidson's *Greek Education*, p. 9.

to know. *It should be a primary object of our teaching to develop in our pupils a sense of respect for, and of the importance of expert knowledge.*

I have already quoted one sentence from President Eliot bearing on this point. Let me quote another: "Democracies will not be safe until the population has learned that governmental affairs must be conducted on the same principles on which successful private and corporate business is conducted and therefore it should be one of the principal objects of democratic education so to train the minds of the children that when they become adult they shall have within their own experience the grounds of respect for the attainments of experts in every branch of governmental, industrial, and social activity, and of confidence in their advice."[1]

QUESTIONS ON THE TEXT.

1. Compare Dewey's conception of education with that of the ancient Greeks and the people of the Middle Ages.
2. Criticise it at length.
3. What is the object of education?
4. What kind of training is required for rational living?

SUGGESTIVE QUESTIONS.

1. Do you agree with the Herbartians that arithmetic may be made a means of much cultivation?
2. What do you think is the chief resource of the school in the way of moral training? In the way of the training of the will?

[1] *Outlook*, Nov. 6, 1897, p. 573.

LESSON XLII.

THE STUDY OF INDIVIDUALS.

Importance of the Study of Children.— "All the roads in the Roman Empire led to the city of Rome." At every turn and corner in our study of our subject, we have seen that successful teaching demands a close, careful, and systematic study of children. At this stage in the history of the world, men have come to realize clearly the fact that, no matter what happens in the physical world there is a cause for it. If a watch stops, or a lock refuses to act, we know that there is a cause for it, and that a patient study of the facts of the case may enable us to discover and remove it. That is precisely the attitude which we should take toward our pupils. If they are not interested in any particular subject, if they are inattentive, if they do not like to go to school, there is a cause for it, and it is our business to learn what it is. Let us not be guilty of the stupidity of saying that some boys "naturally" dislike school. That is an easy explanation to which lazy teachers have a great tendency to resort. But it has a painful likeness to some of the explanations of the Middle Ages. "Moving bodies have a natural tendency to stop," said the scholars of that time. "Some boys naturally dislike books," say many of our teachers now. Precisely as a more careful study of the facts has thoroughly discredited

the former explanation, so I believe a careful study of the facts will thoroughly discredit the latter.

Change in Pedagogical Study. — That the importance of the study of children is beginning to be generally recognized is one of the most encouraging signs of the times. In the beginning of the study of Pedagogy in this country, it was confined almost entirely to a study of methods. Later, it was seen that the most fruitful study of Pedagogy includes a study of the principles that underlie methods; that in order to know *how* to deal with the human mind, we must know why we deal with it thus and so; and that to know the why of our procedure, we must know the laws that govern it. And little by little educators have come to see that, after all, the text-book on Psychology which it is of most importance for teachers to study is one whose pages are ever open before them — the minds of their pupils, and the children with whom they come in contact. Never before in the history of the world was the importance of the study of Psychology to teachers so generally recognized as now. But, suggestive as a knowledge of it is to thoughtful and intelligent teachers, the best result to be expected from it is the development of what Dr. Josiah Royce calls the psychological spirit[1] — the habit of observing children — and of the power to turn that spirit to the utmost possible account. In the first two chapters, we considered the benefits of the study of Psychology to the teacher. The conclusions there reached were such as seemed evident from the very nature of the case, independently of any special conclusions that our study of the mind would enable us to reach. And while

[1] *Educational Review*, February, 1891.

I believe that we shall all agree that the claims there made for it are fully borne out by the facts, I think we shall feel that if our study has made us more interested in the growth and development of the minds of children, more disposed to study them, less ready to dogmatize about them, more eager to learn by actual observation what they can do and what they can not do, what they like and what they do not like, the result of our study will be of incomparably greater value than any there insisted on.

Psychology and Education. — Because Psychology undoubtedly underlies the science of education, I have seen what I can not but regard as a disposition to overestimate its importance. The opinion seems to be entertained in some quarters that every teacher should be a specialist in Psychology. If by that is meant that he must keep well abreast of psychological research, or that he should even be especially interested in current psychological literature, I enter my emphatic dissent. Many an excellent teacher undoubtedly reproaches himself for his lack of interest in it, forgetting that it is as impossible for every teacher to have a special interest in Psychology as it is for them all to have a special interest in mathematics or chemistry. By no such criterion should a teacher test his adaptation for his work. But if a teacher finds himself without interest in children, if he has no disposition to investigate the causes of the facts that thrust themselves upon him every day, if he finds himself disposed to be content with merely verbal explanations — "stupidity," "prejudice," "natural dislike of the subject," "bad home surroundings," "ugliness," etc., I would respectfully suggest that he carefully consider whether he has not mistaken his vocation. A

specialist in Psychology every teacher should not be; special and careful students of the minds of their pupils all teachers should be.

I do not, of course, undervalue the study of psychological literature. But I do believe that the greatest practical benefit it can render to the teacher consists in the help it can give him in his study of children.

Doctrine of Apperception Shows the Necessity of Studying Children. — Our study of apperception will enable us to see how indispensable is the study of children. Whether we are perceiving, remembering, imagining, conceiving, judging, or reasoning, we are alike apperceiving. But apperception is the relating activity of the mind, the activity by which a thing the mind is engaged in knowing is brought into relation with something the mind already knows. In order, then, that the event which we call knowledge may take place in the mind, two conditions must be realized: (1) ideas must exist in the mind of the pupil with which the thing to be known can be brought into conscious relation; and (2) the relation to be established by the particular kind of knowledge must be one which the mind is capable of perceiving.

Contents of Children's Minds. — No one but a careful student of children will avoid assuming that they know what they do not know, and, therefore, that they can understand what they do not understand. Educational journals have been emphasizing this point to such an extent of late years that it would seem that the bare mention of it ought to be sufficient. Nevertheless, its importance is so great that I beg to quote a summary of the results of

the examination of some children in Germany: "It was found in thirty-three people's schools in the Vogtland, in the examination of the newly entered six-year-old children in June of the year 1878, that of 500 city children questioned, 82 per cent had no idea of 'sunrise,' and 77 per cent none of 'sunset'; 37 per cent had never seen a grainfield, 49 per cent had never seen a pond, 80 per cent a lark, and 82 per cent an oak; 37 per cent had never been in the woods, 29 per cent never on a river bank, 52 per cent never on a mountain, 50 per cent never in a church, 57 per cent never in a village, and 81 per cent had not yet been in the castle of Plauen; 72 per cent could not tell how bread is made out of grain, and 49 per cent knew nothing yet of God. Similar conditions were shown in a factory village in the neighborhood of Reichenbach. In that place of 17 children only two knew any river, and what these called a river was a shallow ditch; only two knew anything of God, and one of these thought of the clouds instead. Relatively much more favorable results were obtained in the examination in the other village schools. Of the 300 elementary scholars in these only 8 per cent had never seen a grainfield, 14 per cent had never seen a pond, 30 per cent a lark, and 43 per cent an oak; only 14 per cent had never been in the woods, 18 per cent on the bank of a creek or river, 26 per cent on a mountain, 51 per cent in a church; only 37 per cent could not tell how bread comes from grain; and 34 per cent knew nothing of God."[1] The investigations of President Hall and Superintendent Greenwood showed the same diversity in the contents of children's minds; the same lack of acquaintance with many things the knowledge of

[1] Lange's *Apperception*, p. 161.

which the teacher is likely to presuppose. Manifestly, if we hope to bring about that relating activity in the minds of our pupils in which all apperception consists, we must see to it that they have the proper ideas in their minds.

Ability to Apprehend Relations can not be Ascertained in any A Priori Way. — But the second condition is just as important, and, like the first, it can be ascertained only by the study of individual children. Whether a pupil can bring an idea which I wish to impart to him into the required relation to something he already knows depends on his power to apprehend the relation. When can children learn numbers? *As soon as they can perceive numerical relations.* A child can understand what "three" means when he can perceive the resemblance between three horses and three marbles — when he can perceive that they resemble each other in being threes. Until then any attempt to teach him numbers must result in failure. When also can a pupil study technical grammar intelligently? *When he can form the conceptions with which it deals.* But the only way we can learn when a child can perceive numerical relations, or a boy form the conceptions required in the study of technical grammar is by actual investigation; there is no *a priori* method.

How to Determine what is the Best Curriculum. — But these are not the only kinds of question which the study of individuals must answer. As the title of this lesson is intended to suggest, the term child-study is altogether too narrow to indicate the scope of the investigations that must contribute essential results to the science of education. Compare the courses of study of three

typical institutions: Harvard, Yale, and Stanford. What is the reason for the fundamental differences between them? It is a difference of educational theories. The Harvard theory apparently is based on two suppositions: (1) that a primary purpose of education is to make a man an expert in some department, on the ground, in part, that the needs of modern life require that a man be capable of rendering expert service to society, in part, on the ground that a man who knows by his own experience what expert knowledge is will have proper respect for it in other lines; (2) that the field in which a man's aptitudes best qualify him to become an expert will be most reliably indicated by his own unrestricted preferences.

We have already seen that respect for expert knowledge is an indispensable part of a preparation for rational living. Among the questions, therefore, which must be answered before we have a right to a final opinion as to the wisdom of the Harvard plan, are these: (1) Does the possession of expert knowledge in one field give a man proper respect for it in other fields? (2) Are the unrestricted preferences of students the most reliable indications of their special aptitudes? These, manifestly, are questions of fact, questions which can not be answered in any *a priori* way. We can answer them only by a careful and comprehensive study of *results*.

Importance of Discovering a Child's Special Gift. — We can further illustrate the necessity of the study of individuals by a quotation from the article already cited. "Another important function of the public school in a democracy," says President Eliot, "is the discovery and development of the gift or capacity of each individual

child. This discovery should be made at the earliest practicable age, and once made, should always influence, and sometimes determine, the education of the individual. It is for the interest of society to make the most of every useful gift or faculty which any member may fortunately possess; and it is one of the main advantages of fluent and mobile democratic society that it is more likely than any other society to secure the fruition of individual capacities. To make the most of any individual's peculiar power, it is important to discover it early, and then train it continuously and assiduously. . . . In the ideal democratic school no two children would follow the same course of study or have the same tasks, except that they would all need to learn the use of the elementary tools of education — reading, writing, and ciphering. The different children would hardly have any identical needs. . . . The perception or discovery of the individual gift or capacity would often be effected in the elementary school, but more generally in the secondary; *and the making of these discoveries should be held one of the most important parts of the teacher's work*. . . . There is no such thing as equality of gifts, or powers, or faculties, among either children or adults; on the contrary, there is the utmost diversity; and education and all the experience of life increase these diversities, because school and the earning of a livelihood, and the reaction of the individual upon his surroundings, all tend strongly to magnify innate diversities. The pretended democratic school with an inflexible programme is fighting not only against nature, but against the interests of democratic society. Flexibility of programme should begin in the elementary school years before the period of secondary education is reached. There should be some

choice of subjects of study by ten years of age; and much variety by fifteen years of age. On the other hand, the programmes of elementary as well as of secondary schools should represent fairly the chief divisions of knowledge, namely, language and literature, mathematics, natural science, and history, besides drawing and music. If school programmes fail to represent the main varieties of intellectual activity, they will not afford the means of discovering the individual gifts and tendencies of pupils." Whatever differences some of us may feel with respect to details, I think we shall all agree that one of the important functions of education is to help pupils discover what they are best fitted to do, and this function can only be performed by schools which lay great emphasis upon the study of individuals.

Extension of Study of Individuals by Means of History. — These illustrations, taken almost at random, have enabled us to realize how not only the science, but the art of education depends largely upon the study of individuals. If we extend this individual study by means of history, we shall find conceptions of the human mind constantly modified in a suggestive and helpful way. The sluggish Oriental, the intellectual Athenian, the superstitious knight of the Middle Ages, are so many different forms into which our common human nature has been carved by that marvelous sculptor — education. The teacher who studies history from the point of view of Psychology will not only find himself in possession of constantly growing and useful and inspiring knowledge of historical facts, but he will find his knowledge of the human mind enlarging, and his realization of the

almost omnipotence of education ever growing more vivid.

Summary. — We may sum up the benefits which a study of children, or of individuals, as I prefer to state it, may render to the teacher as follows: (1) It will help him see at what stage in the development of his pupils the various subjects which pupils should study should be taken up; (2) it will help him in determining how much pupils can learn; (3) it will help him decide how much work can be safely required of pupils; (4) it will help him discover the special gifts of pupils; and (5) it will help him at every step in his work by helping him to ascertain what his pupils know of the subjects he is trying to teach.

QUESTIONS ON THE TEXT.

1. What was the character of the first study of Pedagogy in this country?
2. How is it studied now?
3. Mention some of the cautions which you should bear in mind in studying children.
4. Mention some of the things to be observed.
5. Mention some of the questions to be asked in learning the contents of children's minds.
6. Can you study Psychology in history?
7. State at length the benefits to be derived from the systematic study of children.

APPENDIX A.

THE case mentioned illustrates a dangerous tendency in our most highly organized schools — the tendency to forget the individual in the multitude. In our zeal for organization, we are in danger of losing sight of the fact that the school exists for the individual, not the individual for the school. However hard it may be to draw the line in practice, the principle is perfectly clear. Whenever it is evident that the individual will be injured by conforming to the requirements that are supposed to be good for the multitude, he should be excused from them. Society has too great an interest in the best possible education of all its members to justify the sacrifice of any of them to the demands of an unattainable and therefore impracticable ideal.

APPENDIX B.

WHEN it is remembered that the inferential method may base its inferences on facts obtained in a variety of ways, it is easy to see that there may be various subdivisions of it. When its facts are obtained by comparing animals with human beings, it is called the comparative method; when by experiment — as when we ascertain how long a time elapses from the contact of an object with any part of the body to the sensation — it is called the experimental method, and so on.

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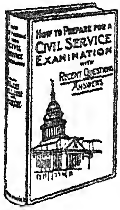

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